1990

Life history and developmental correlates of female vocational preferences: a multivariate study

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Order Number 9100497

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Iowa State University, 1990

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Life history and developmental correlates of female vocational preferences: A multivariate study

by

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A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY

Major: Psychology

Approved:

Signature was redacted for privacy.

In Charge of Major Work

Signature was redacted for privacy.

For the Major Department

Signature was redacted for privacy.

For the Graduate College

Iowa State University
Ames, Iowa
1990

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ABSTRACT

The primary purpose of the present study was to assess the relationship among life history experiences, sex-roles, self-esteem and women's vocational preferences according to Holland's vocational typology. The sample consisted of 296 undergraduate female college students. Data were gathered via four questionnaires: the Strong Campbell Interest Inventory (Hansen & Campbell, 1985); the Biographical Questionnaire (Owens, 1971); the Bem Sex-Role Inventory (Bem, 1981); and the Self-Esteem Inventory (Coopersmith, 1987). Subjects were then classified according to Holland's vocational personality types (Realistic, Investigative, Artistic, Social, Enterprising and Conventional).

Both discriminant analyses and canonical correlations demonstrated the validity of using life history information, sex-roles and self-esteem to predict female vocational preferences. In particular, sets of biographical variables effectively discriminated among Holland personality types. This finding suggests the utility of using specific life history information to predict female vocational preferences. Because their overall discriminating power was not as great as that of biographical information, sex-roles and self-esteem seem to be of secondary importance in understanding women's vocational preferences. Moreover, since the variables that discriminated between particular Holland codes seemed to

conform with Holland's description of those personality types, Holland's vocational theory appears to be generally applicable to college women.

INTRODUCTION

Since the 1960s there has been a resurgence of interest in vocational behavior, which has been evidenced in the development of plans, systems and methods for the facilitation of vocational exploration, preparation and decision making. It is not surprising that, in a society in which many people have the opportunity to choose their careers and the overall importance of work is understood, attempts to understand the decision-making processes involved in the vocational realm should be made (Eberhardt, 1979).

In addition to the general resurgence of interest in vocational behavior, many theorists have been focusing on a specific group of subjects--women. The reason for this emphasis is due to the many societal changes that occurred in conjunction with, or following, the Women's Liberation Movement. For example, more women have entered the work force, more women have obtained professional jobs, and sex-role stereotypes have shifted. Because of these and many other recent societal changes, the present investigation examines the vocational behavior of women.

In this investigation, the vocational behavior of women is examined in terms of Holland's (1973) theory, one of the most formidable and widely used vocational behavior theories. Therefore, it is important to review the theoretical framework and literature relating to Holland's vocational typology.

Following this, I expound upon the reasons for emphasizing female vocational behavior and review the literature on three psychological constructs (life history experiences, sex-role orientation, and self-esteem), which were examined in relation to women's vocational behavior.

Holland's Vocational Typology

Primary assumptions

Holland's theory of vocational selection represents a merging of two streams of thought. He links the hypothesis that career choices represent an extension of personality with the notion that people project their views of themselves and the world of work onto occupational titles. Holland assigned people to modal personality types by simply allowing them to express their feelings about a particular list of occupational titles. Thus, Holland assumed that occupational stereotypes are based on an individual's experiences with work, and, therefore, they possess a great deal of accuracy and utility. Moreover, he hypothesized that when an individual has limited knowledge about a particular vocation, the individual's stereotypes reveal personal information, much like a projective test (Osipow, 1973).

Like other trait-factor theories, Holland's theory has five general characteristics: (1) traits are not assumed to be independent of each other; (2) data quantification is

valued, but the importance of subjective techniques for assessing individual differences is not overlooked; (3) external validation of constructs is sought; (4) the theory is interactive in nature--environments influence the personalities of individuals in them and individuals act on environments as they attempt to implement their values and fulfill needs; and (5) the average person has the innate ability to make adequate decisions, because both personal and environmental data are available (Brown, 1987).

Holland's theory, originally explicated in a journal article (1959), has been modified and expanded as a result of his own research (1962, 1966, 1973, 1985, 1987). The theory is based on four major assumptions. First, most persons can be categorized as one of six personality types: Realistic, Investigative, Artistic, Social, Enterprising, or Conventional (Table 1). Each type is a characterization of what is known about people in a given occupational group. Basically, each type is an ideal or theoretical model against which the real person can be measured.

According to the theory, the interaction between a variety of cultural and personal forces (e.g., peers, parents, and social class) produces the various types. Based on personal experiences with these forces, the individual learns to prefer some activities more than others. Over time, these preferences are developed into strong interests and these interests lead to a special group of competencies. Finally, a

Table 1. Description of personality types (from Holland, 1985)

Type	Personality
Realistic	-Mechanical ability; -Values concrete objects, power, money and status; -Social conforming, frank, materialistic, practical, stable.
Investigative	-Mathematical and scientific ability; -Analytical, cautious, critical, independent, methodical, rational, reserved, unpopular.
Artistic	-Artistic and musical ability; -Values aesthetic qualities; -Complicated, disorderly, emotional, impulsive, nonconforming, original.
Social	-Teaching ability; -Values social and ethical activities and problems; -Cooperative, friendly, helpful, insightful, responsible, tactful, understanding.
Enterprising	-Leadership and persuasive abilities; -Values political and economic achievement; -Acquisitive, ambitious, domineering, optimistic, self-confident, talkative; -Lacks scientific ability.
Conventional	-Clerical and numerical ability; -Values business and economic achievement; -Conforming, conscientious, inflexible, inhibited, orderly, practical, self-controlled, unimaginative.

person's interests and competencies merge to create specific personal attributes, which lead to particular behavior.

By comparing a person's attitudes with those of each of the six personality types, the type that most closely resembles that individual can be determined. The model type

then becomes an individual's personality type or orientation. Comparison of a person's resemblance to each of the model types yields a pattern of similarity and dissimilarity. For example, a person may more closely resemble a Social type than an Investigative type, and so on. In theoretical terms, this pattern is known as the person's personality pattern. This six-category scheme allows a simple ordering of a person's resemblance to each of the six models, thereby providing the possibility of 720 different personality patterns for coping with the environment.

The second basic assumption of the theory is that there are six modal work environments which are described by the people who comprise them: Realistic (e.g., carpenters, farmers); Investigative (e.g., chemists, physiologists); Artistic (e.g., musicians, photographers); Social (e.g., social workers, clergy); Enterprising (e.g., salespersons, realtors); and Conventional (e.g., bookkeepers, clerical workers) (see Table 2). Each environment is dominated by a given personality type, and characterized by physical settings that present special problems and opportunities. For instance, Investigative environments are dominated by Investigative people--that is, most people in the Investigative environment resemble the Investigative personality type.

The six personality types have different interests, competencies and dispositions. Moreover, individuals tend to

Table 2. Description of environmental models (Holland, 1985)

Type	Model
Realistic	-Fosters manipulation of objects, machines or animals, and technical competencies or achievements; -Rewards displays of monetary, power and possession values; -Encourages a simple, traditional world view.
Investigative	-Fosters observation and systematic investigation of phenomena, and scientific competencies and achievements; -Rewards displays of scientific values; -Encourages a complex, abstract, independent, and original Weltanschauung (world view).
Artistic	-Fosters artistic competencies and achievements, and ambiguous, free or unsystematized work; -Rewards displays of artistic values; -Encourages complex, independent, unconventional and flexible Weltanschauung.
Social	-Fosters interpersonal competencies and informing, training, curing or enlightening others; -Rewards displays of social or humanitarian values; -Encourages flexible Weltanschauung.
Enterprising	-Fosters persuasive and leadership competencies and achievements, and the manipulation of others for personal or organizational goals; -Rewards displays of enterprising values and goals (money, power, status, etc.); -Encourages power, status, responsibility, and stereotypically simple Weltanschauung.
Conventional	-Fosters conformity and clerical competencies, and explicit manipulation of data, records, or written material; -Rewards displays of monetary, dependability and conformity values; -Encourages conventional, stereotyped, and dependent Weltanschauung.

associate themselves with people, materials and problems that are congruent with their interests and competencies. Therefore, where people congregate, they create an environment that reflects their personality type. Thus, the environment can be assessed in the same terms that individuals are assessed. In other words, each environmental model is typified by the tasks performed and by the atmosphere created by the dominant personality type.

Third, Holland's theory assumes that people seek environments that match their personality types. That is, people seek environments that will allow them to exercise their skills and abilities, express their attitudes and values, and take on desirable problems and roles. Therefore, Realistic types seek Realistic environments, Investigative types search for Investigative environments, and so on. In addition, albeit to a lesser degree, environments search for people through friendships and recruiting methods.

Finally, Holland assumed that behavior is determined by an interaction between environment and personality. Theoretically, if a person's personality and environment patterns are known, behavioral outcomes of the pairing can be determined (e.g., vocational choice, job changes, educational and social behavior). Five secondary assumptions are also delineated in Holland's (1985) theory. The purpose of these secondary assumptions is to qualify predictions made from the four major assumptions. The five secondary assumptions

include consistency, differentiation, identity, congruence and calculus.

Secondary assumptions

Consistency refers to the degree of relatedness between personality types or environments. Because the types are differentially related to each other, some pairs of personality types are more closely related than others. For instance, Enterprising and Social types have more in common than Realistic and Social types. If an individual's personality pattern includes closely related traits (e.g., Realistic and Investigative) it is said to be consistent. On the other hand, if a personality profile includes opposing traits (e.g., Realistic and Social) it is inconsistent. The theory further assumes that consistency affects the stability and predictability of vocational preference; the more consistent an individual's personality profile is, the more stable and predictable are his vocational preferences.

Differentiation also has an impact on occupational preferences. An individual who closely resembles a single type, or an environment dominated by one type, is said to be highly differentiated. If an individual closely resembles many types he will vacillate in selecting an occupational environment.

Another secondary concept that relates to the clarity, definition, and focus of the personality types, or environmental models, is identity. Identity is defined as the

possession of a clear and stable picture of one's goals and interests. Holland (1985) states that all three of these secondary assumptions represent techniques for assessing the same concept--clarity and/or stability.

The fourth secondary concept is congruence. Different types of personalities require different environments. If an individual's personality type matches the environment he or she works in, the rewards and opportunities will match his/her preferences and abilities. For example, a Social type in a Social environment can explore the activities he or she enjoys, has the social competencies the environment demands, and can perform the task that he or she values.

The final secondary assumption is that the relationship between the types or environments can be ordered according to a hexagonal model--calculus. According to Holland (1985), the outer rim of the hexagon reveals the psychological relationship between types and environments (see Figure 1). Environments and types that are similar to one another are closer together than those that are dissimilar. For instance, Realistic is similar to both Investigative and Conventional, but dissimilar to Social, which is located completely across the hexagon.

The similarities among types, among environments, and between types and environments are estimated according to the hexagonal model. This model arranges the types and environments according to their psychological similarities and

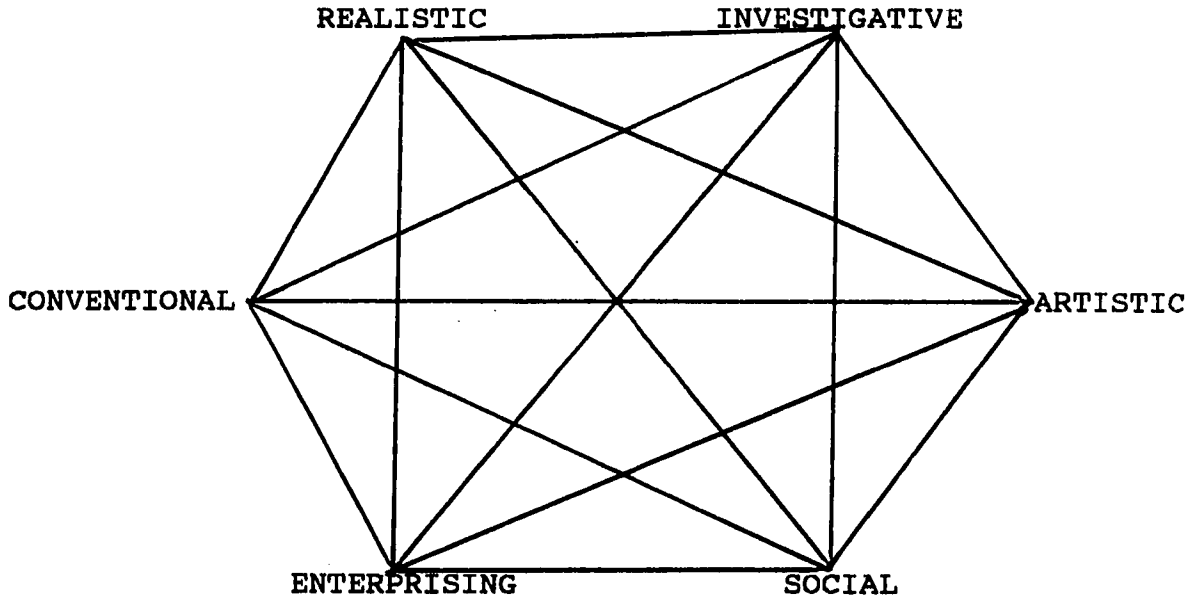

Figure 1. A hexagonal model for defining the psychological resemblances among types and environments and their interactions (from Holland, 1985, p. 29)

differences. Similarity of types or environments is inversely related to the distance between them on the hexagon as described earlier. The hexagonal model is also used to define the degree of person/environment congruence. For example, a Realistic person in a Realistic environment is in the most congruent situation; whereas, a Realistic person in a Social job is in the most incongruent situation possible, and so on.

Principles underlying Holland's vocational typology

Several principles that Holland deemed plausible and therefore utilized in developing his typology are now appropriately introduced. First, selecting an occupation is assumed to be an expression of a person's motivation, knowledge, personality and ability. In other words, the

choice of a vocation is viewed as an expression of personality. Moreover, "vocational interests" are construed as an important aspect of personality. Research has revealed that vocational preferences are moderately correlated with personality scales (Holland, 1973), personality traits and life goals (Baird, 1970), parental attitudes (Medvene, 1969), and many other psychological and sociological variables. Holland's theory is primarily an elaborate engineering of this key idea--vocation is an expression of personality.

Following logically from this first principle, interest inventories are essentially assumed to be personality inventories. According to Layton (1958):

> The interest of an individual can be defined as his [or her] like for, dislike for, or indifference to something such as an object, occupation, a person, a task, an idea, or an activity. Interests are one aspect of what is broadly considered as the motivation of an individual. Consequently, interests reflect the goals, needs, values, and specific motivations of the individual. Thus, interests are a part of the person's personality structure or organization. When the individual's interest is described in relation to occupations or the world of work, we speak of his [or her] vocational interest or interests. (pp. 3-4)

The expression of interest inventories as personality inventories is the second background principle used by

Holland. If "vocational interests" are construed as expressions of personality, it is a small step to view interest inventories as personality inventories. Although the two types of inventories are quite different in content, they are identical in principle and provide similar information about the test taker. Both personality and interest inventories reveal how an individual perceives his or her self and environment. Based on this idea, Holland constructed the Vocational Preference Inventory (VPI), a personality inventory composed solely of occupational titles. Holland (1985) describes the rationale for the development of the VPI as follows:

> Occupations represent a way of life, an environment rather than a set of isolated work functions or skills. To work as a carpenter means not only to use tools but also to have a certain status, community role, and a special pattern of living. In this sense, the choice of an occupational title represents several kinds of information: the subject's motivation, his knowledge of the occupation in question, his insight and understanding of himself, and his abilities. In short, item responses may be thought of as limited but useful expressive or projective protocols. (p. 8)

The third background principle is that occupational stereotypes have important psychological and sociological meanings. In other words, the vocational world is viewed by

most people in terms of vocational stereotypes. An extensive body of literature provides evidence of the validity of this assumption (e.g., Gottfredson, 1982; O'Dowd & Beardslee, 1960, 1967). In addition, these stereotypes seem to be stable over time, and are independent of the vocational experience and gender of the perceiver. Since interest inventories would have little or no validity if perceptions of occupations were not valid, these findings have considerable import for the field of vocational behavior.

Holland's fourth principle is that members of an occupation have similar personalities and histories of personal development. Holland theorized that if a person enters a particular vocation because of his personality and life history, the fact that each occupation attracts and retains people with similar personalities logically follows. In 1951 Laurent conducted a study with engineers, physicians and lawyers as subjects. His study documented the similarities of life history experiences for members of a particular vocation. There are several other studies that support this contention (e.g., Chaney & Owens, 1964; Eberhardt & Muchinsky 1982b; Kulberg & Owens, 1960; Nachmann, 1960; Roe, 1957). This assumption is particularly important to the present study.

Validity of the theory

As evidenced in the previous section, the background principles that Holland utilized in the development of his

theory have garnered moderate support. In turn, his theory of careers and its occupational classification system have also received modest support. For example, Hanson, Lamb and English (1974) cite empirical evidence that supports both the theoretical and practical value of the conceptual framework proposed by Holland. Furthermore, Holland (1973) summarized over 100 empirical studies about the characteristics associated with the six VPI scales or people categorized as one of the six personality types. More than 90 of these studies reportedly yield supportive evidence (Holland, 1973).

The construct validity of the theory has been tested by relating the VPI to other personality measures. The convergent validity between the VPI and other similar scales has usually been weak to moderate. For example, the VPI has been shown to be modestly intercorrelated with the California Personality Inventory (Folsom, 1971), the Minnesota Multiphasic Personality Inventory (Holland, 1965), Catell's 16 Personality Factors (Williams, 1972), the Thurstone Temperament Schedule (Holland & Nafzinger, 1972), and the Orientation and Motivation Inventory (Lorr & Stefic, 1978).

Considerable interest has also developed in relating the VPI to other interest inventories. One method has been the application of canonical correlational analysis to a combination of interest inventories. For instance, Navran and Kendall (1971) performed a canonical analysis of the VPI, the Strong Vocational Interest Blank (SVIB), and the Edwards

Personal Preference Inventory (EPPS). They concluded that the VPI and SVIB are more closely related to each other than to the EPPS, but enough differences exist between the two to make them both worthwhile. Cole and Hanson (1971) found that the VPI, the SVIB, the Kuder Occupational Interest Survey, the Minnesota Vocational Inventory, and the ACT Vocational Interest Profile were all similar.

The development of the General Occupational Themes of the Strong-Campbell Interest Inventory (SCII), the most recent revision of the SVIB, was guided by Holland's occupational taxonomy. Scales using SCII items were created for Holland's six basic categories of occupational types, and then applied to the extensive amount of data collected by Strong (Campbell & Holland, 1972; Hansen & Johansson, 1972). Due to the strength of this research, Holland's system was used to organize the profile scores for the SCII (Campbell & Hansen, 1981).

Evidence also indicates that the theory exhibits criterion-related validity. For example, Holland (1968) used longitudinal designs with large diverse samples of college students to test some of the hypotheses associated with his theory and found that various personality types and profiles did indeed exhibit the characteristics suggested. Thus, the concurrent and predictive relationships based on Holland's theoretical formulations were supported.

Gaffey and Walsh (1974) provide further support for the

concurrent validity of the theory by revealing a relationship between the occupations of employed adults and their scores on the VPI. Holland (1962, 1968) conducted similar studies with college student samples, relating college majors to VPI scores. These results provided evidence of concurrent validity as well. Moreover, in studies of vocational aspiration, Holland codes have been found to be predictive of choice of major field and occupation over one and two year intervals (Holland, 1962; Holland & Lutz, 1968).

Holland's secondary assumption of congruence, in particular, has attracted considerable attention. In terms of Holland's theory, congruence refers to the degree of consistency between an individual's personality type and the occupational environment of his preferred or planned field. Congruence has been studied with both student and employee populations. Spokane (1985) reviewed the literature on person-environment congruence in relation to Holland's theory and found that correlational studies consistently show significant positive relationships between congruence and academic performance and persistence, job satisfaction, stability of choice, perceived congruence, and personality. According to Spokane (1985), however, the relationships between congruence and self-concept or sociability are not supported. In addition, the current research available on congruence has been criticized for ignoring predominately female-blue collar jobs. Heesacker, Elliot and Howe (1988)

addressed this problem by conducting a study with a large sample of garment workers. The number of Conventional subjects was not significant and the number of Realistic workers was less than expected, as was the number of Investigative and Enterprising subjects. Social subjects, however, were significantly more frequent than expected. Because, according to Holland, the garment worker's environment is Conventional-Realistic, Holland's theory that people gravitate toward a work environment congruent with their personality was not supported (Heesacker et al., 1988).

Overall, investigations of Holland's vocational theory have been very extensive. There is considerable evidence from Holland's research that the personality types as described by Holland exist. Many characteristics and traits can be used to differentiate the six personality types from one another. Hence, if an investigator obtains an individual's personality profile that person's vocational choice, personal characteristics, and the stability of vocational selection can be predicted with some certainty.

However, many researchers still have grave concerns about the applicability of Holland's theory to new and more diverse samples. For instance, Brown (1987) believes that Holland's theory, while the best theory of vocational choice currently available, fails to adequately account for the process that leads up to personality development and fails to deal effectively with questions concerning racial minorities and

women. Moreover, some authors suggest that the study of women's occupational choice and career development is something of an afterthought in psychology. In particular, Lips and Colwill (1988) note that measures and models of vocational choice were created with men in mind and, although the impact of social factors is acknowledged, such factors have not been integrated into these theories.

Recent research reflects some of the problems inherent in applying Holland's theory to women. For example, Holland's theory that person-environment congruence leads to increased satisfaction and productivity, but reduced absenteeism and injury, was not supported in a study of a female-dominated blue collar industry (Heesacker et al., 1988). In a similar vein, Henry and Bardo (1987) examined the congruency concept in Holland's theory utilizing a sample of premedical students. While they reported positive support for Holland's theory, there was a significant difference between males and females on the Realistic and Investigative types. Likewise, Prediger and Hanson (1976) found substantial and systematic differences in the Holland raw scores of males and females pursuing the same occupations, especially nontraditional vocations. Other aspects of Holland's theory have also met with mixed results when applied to women. For example, when applied to females Holland's classification structure has been found to deviate minimally from the structure found for males. For females, the structure resembles IRASEC rather than RIASEC (Feldman &

Meir, 1976).

Forrest and Mikolaitis (1986) note two trends in the literature regarding the application of vocational theories to women. First, several authors believe that with slight modifications these theories can also be applied to women. Second, other researchers believe that new theories are needed to explain women's career development. Holland (1987) does not believe that a separate theory is required for women. He reports evidence from the application of the theory to men and women of different ages that theoretical predictions work as well for women as they do for men: "Most theoretical tests have been based on men and women and have met with about equal success" (p. 27). Because research on how Holland's theory applies to women has produced a variety of findings, additional studies are needed to determine its utility for, and applicability to, women (Miller, Heck & Prior, 1988).

Women's Issues

Changing trends in labor force participation

The accelerated growth of women's labor force participation began in 1940. By 1970, 50% of American women between the ages of 18 and 64 were participating in the work force, compared with 30% in 1940 and 20% in 1900. In 1900, if the average woman worked at all it was before marriage and children. Starting in the 1940s, however, this pattern began

to change. The first departure was the entry or reentry of women over 35 years of age into the labor force. By 1970, between 49 and 54% of women in the 35 to 59 year age group were participating in the work force (Oppenheimer, 1973). Likewise, the percentage of women in the experienced civilian work force increased from 38 to 43% between 1970 and 1980, and 57% of the workers added to the work force in the 1970s were women (Rytina & Bianchi, 1984).

Another recent trend in the work force, which began in the 1950s, was the increased participation of younger married women, including those with young children. Work has become an important and continuing part of womens' lives, both before and after they marry and start raising children (Oppenheimer, 1973). By 1975, 36.6% of all married women with children under six were working (Blau, 1978).

Spiraling economic inflation, legislation and litigation attacking sex discrimination, the feminist movement, and divorce are some of the factors that have led millions of women into the work force. Yet once in the work force, the majority of women still cluster in occupations traditionally assigned to their gender (Aneshensel & Rosen, 1980). The educational system has contributed to occupational stratification between the sexes by encouraging and preparing girls to pursue an extremely limited number of traditionally "feminine" roles (Wirtenberg & Nakamura, 1976). Although children tend to identify many occupations as equally suitable

for both sexes, their occupational likes and dislikes (expressed interests or preferences) are often sex-linked (Gregg & Dobson, 1980). Existing research demonstrates that, almost from the time they enter school, girls appear to restrict the range of occupations open to them. Frost and Diamond (1979), for example, reported that girls and boys in three ethnic groups indicated preferences for occupations stereotyped for their own gender, although girls (particularly Anglo girls) showed a greater tendency to cross sex-stereotyped lines.

On the other hand, data from reports published by the U.S. Office of Education show that a net increase in the number of women in traditionally male curricula occurred between 1966 and 1976. In addition, the increase in women in traditionally male areas was greater than the increase in sex-neutral or traditionally female areas (Lyson, 1981). With the recently increasing numbers of students entering fields traditionally dominated by the opposite sex, the question of sex appropriateness of an occupational choice has become a growing issue (Strange & Rea, 1983).

Antecedents of occupational choice

Despite the entry of small numbers of women into nontraditional fields, women are still largely confined to traditionally female jobs (Wirtenberg & Nakamura, 1976). Research on attitudes towards occupations and occupational choices has found that occupational gender-typing is prevalent

in American society. There is considerable evidence that females of all ages make their occupational choices from a narrow range of occupations and that they tend to prefer gender-appropriate jobs (Kenkel & Gage, 1983). For example, a comparison of the distribution of women by major occupational group in 1959 and 1970 showed no decline in the concentration of women in female occupations (Oppenheimer, 1973). Thus, although increasing numbers of women are working, they remain concentrated in the lower levels of the professional hierarchy and in female-dominated occupations, despite attempts to decrease gender discrimination (Eccles, 1987).

In order to eliminate the substantial gender segregation in the American labor force, over three-fifths of the female (or male) workers would have to be reallocated among occupations (Waite & Berryman, 1986). Psychological factors contribute to womens' underrepresentation in some occupations, especially in management, professional and scientific careers (Eccles, 1987). Occupational segregation may be due to the fact that women who want to marry and have children choose occupations into which late entry or reentry are typically feasible options. Other women expect to work even when they have young children. These women tend to have more liberal sex-roles and they tend to have the expectation of continuous labor force participation, which allows them to consider a broader range of occupations including those sex-typed as male. Furthermore, the feminist movement, new patterns of

socialization, and the reality that women now occupy dual domestic and career roles have led adolescent women to conceive of their sex-roles in nonconventional terms. Such sex-role innovative females consider a wider range of vocational opportunities (Aneshensel & Rosen, 1980). These changing conditions have decreased the likelihood for women to restrict themselves to traditional jobs (Hannah & Kahn, 1989).

Although first-year college women are now more likely to choose careers traditionally dominated by men than were women in the 1970s, the differences in career choice between men and women have not been substantially reduced; for the most part, the same pattern of change in career choice holds for both men and women (Peng & Jaffe, 1979). For example, Rytina & Bianchi (1984) found that between 1970 and 1980, the degree of sex-segregation declined because the proportion of both sexes employed in neutral occupations rose 20 percentage points. On the other hand, Harmon (1981) studied women whose college-age years corresponded to the rebirth of feminism in the United States. She found that their life and career patterns after college were very similar to women who did not experience the rebirth of feminism during college. The only difference was that 20% more of the group planned to work throughout their life. These results were interpreted as portraying the importance of socialization prior to the age of 18.

In another study of college students, Etaugh and Spandikow (1981) indicated that with increasing years of

college attendance, students showed more liberal attitudes towards women. For both genders, attitudes involving womens' educational and vocational rights become more liberal than those involving women's marital and maternal rights. A massive twenty-year study (1966-1986) of college freshmen shifts in values, attitudes, and goals has also been conducted by administering surveys to over six million students in more than 1250 academic institutions (Astin, Green, Korn & Schalit, 1986). Three significant changes were discovered: (1) a decrease in academic skills; (2) changes in preferences for college majors and careers; and (3) changes in personal goals. In the area of career preferences, some notable trends emerged. For example, in 1966, 40% of freshmen women indicated an interest in school teaching. For men it was less than 12%. In 1985, these levels dropped dramatically--9.6% for women and 2.6% for men. Unlike teaching, business has shown a dramatic increase in popularity, particularly for women; since 1966 there has been a 50% increase in the number of women reporting a preference for business careers (Blai, 1987).

Research has also revealed that the expected age at marriage and expected family size are significantly related to occupational expectations of women, but not men. The earlier a woman expects to marry and the greater the number of children she expects to have, the lower her occupational expectations (Aneshensel & Rosen, 1980). Contrary to the

traditional sex-role distinction noted in the career development literature, Strange and Rea (1983) found that both males and females assigned the greatest degree of importance to personal interests in making their career choice, and neither gender reported much consideration of future marriage plans in making their decision.

Slevin and Wingrove (1983) examined three generations of women and found considerable generational differences with regard to attitudes toward female roles in society. The findings also revealed the complexity of women's attitudes toward their changing roles in society--the youngest generation was not uniformly liberal, nor was the oldest cohort uniformly conservative, indicating an overlap of agreement among the generations. In a similar vein, Lewin and Tragos (1987) did not find support for the hypothesis that sex-role stereotyping has decreased over the past 26 years. They were unwilling to conclude, however, that the feminist movement and the social changes since 1970 have had no effect on youth. Rather, they preferred to suggest that changes in the cohort they sampled were too weak to appear on their measure, that their subjects were too young to show the impact of the feminist movement, or that their questions were simply misdirected (lacked construct validity).

Studies concerning the views of today's college females also present interesting findings. Renzetti (1987) found that, although college women tended to hold nontraditional,

but only moderately feminist attitudes toward gender roles, they were highly aware of gender inequity and supportive of the women's movement. In addition, students who had personally experienced sex discrimination were less traditional and more feminist in their gender attitudes and showed stronger support for the women's movement, regardless of class level, than students who had not had such an experience.

Thus, even after the advent of the women's movement and the recent social changes, many attitudinal and occupational arenas in which sexual stereotypes prevail still exist. Korman (1971), for instance, reports that different forms of behavior for men and women are sanctioned by society. He asserted that the homemaker role sanctioned for women has lead to underdeveloped vocational interests. Only women who choose to work, however, are violating role expectations. These women are often stereotyped as tough, hard-driving, bad mothers, aggressive and competitive (Darley, 1976). Research has also revealed that women tend to believe that men desire a family-oriented, permissive woman, while men actually desire a woman with a balance of intrafamily and extrafamily feelings (Steinmann & Foxx, 1966). Moreover, women still tend to devalue feminine professional competence (Baruch, 1972). Stokes and Peyton (1986) reported that women who were homemakers held more conservative values and a more traditional view of women's roles, experienced a more

supportive family life, expressed lower self-esteem, and were less dissatisfied than women who worked outside of the home. Women who worked outside of the home rated themselves as more aggressive, ambitious, and intelligent than did homemakers. However, they were more dissatisfied than homemakers.

In contrast, Fiorentine (1988) notes that a dramatic social transformation has resulted in increased approval of wives working, even when there is no financial need. He found that from 1969 to 1984 there was an increase on the value that women place on status-attainment goals, but no comparable decrease in the value they place on domestic-nurturant goals. This is revealed by the fact that there has been a greater increase in the percentage of women than men seeking graduate degrees and professional/executive occupations; currently, nearly half of those aspiring to advanced degrees are women. Similarly, between 1970 and 1981 there was a marked shift in women's sex-role attitudes away from the traditional. By 1981, most women seemed to reject the ideas that education and job opportunities are more important for men, and that all women should marry, stay at home, have children and leave major family decisions to her husband (Tallichet & Willits, 1986). Another recent study also showed that the number of women supporting the notion that the activities of married women should be confined to the home and family was at an all time low since 1966 (Blai, 1987).

Congruence of vocational interests and values

The research and ideas surrounding the congruence of vocational interests and values of women and men has been very mixed. On the one hand, many researchers believe that vast differences still exist in terms of male and female career interests and aspirations. For instance, Hansen (1988) reported that 50 years of societal change seems not to have had a dramatic effect on the interests of women, with the exception of a general trend towards decreased interests in Conventional occupation and increased interests in Enterprising or business-related interests. However, this change is not idiosyncratic to women--data for men show the same trend. In addition, Brenner and Tomkiewicz (1979) found men to be less homogeneous in their career preferences than women. Also males were found to value long-range career objectives while females preferred a comfortable working environment and pleasant interpersonal relations.

Similarly, in a longitudinal study, Herzog and Bachman (1982) found that female high school seniors attribute more importance to altruistic and people-oriented aspects of a job and to its stimulating and intrinsically rewarding potential, but less to its economic aspects and other external rewards than do men. They concluded that there had been little change since 1976, and, therefore, little decline in sex differences. In contrast, Siegfried et al. (1981) examined the importance of job characteristics for college students. The results

revealed that both males and females rated motivating factors (e.g., achievement and promotion) as important, but females also placed importance on hygiene factors (e.g., salary and working conditions). Males tended to underestimate the importance of motivators for females, while females overestimated the importance of hygiene factors for males. According to Ginzberg et al. (1951) occupational choice does not appear to differ by sex up through college. However, after college, strategic influences on women are markedly different than those of men because women think of and plan for their future primarily in terms of marriage and are, thus, not as deeply concerned about an occupation. In a recent review of 22 studies, Betz and O'Connell (1989) suggested that women bring different values and traits to their work roles because of earlier gender training. Gender differences were found in preferences for work rewards, hours, and employment status even when occupation was controlled for. For example, female veterinarians work only 70% of the hours that male veterinarians do.

On the other hand, many authors believe that congruence between male and female occupational preferences and desires has increased dramatically over the past several years. According to Osipow (1975), existing data suggest that in most respects women have work motivations similar to those of men and they desire the same rewards. However, the proportion of women employed in jobs that are congruent with their personal

attributes is lower than for men. Thus, significant similarities seem to exist between female and male career development. Moreover, in 1977, L. W. Hoffman wrote that sex-linked differences in socialization were expected to diminish as work comes to occupy more of a woman's adult life. The result should be the elimination of sex-differences in behavior. Similarly, Fiorentine (1988) states that:

> [T]he evidence indicating an increasing congruence in the values and career aspirations of the sexes suggests that while the process of childhood socialization may continue to be sex differentiated, it is no longer so differentiated that it effectively channels boys and girls to pursue different life goals. (p. 154)

In summary, there remain many unanswered questions concerning attitudes and behavior of women. As noted above, many researchers are concerned about the applicability of vocational theories to women. This investigation, therefore, focuses on assessing whether Holland's vocational typology can be effectively applied to a cohort of college females.

Life History Experiences

"One theme inherent in most vocational choice theories is that an individual's life experiences either have a direct effect on the decision to pursue a certain vocation or an indirect effect through postulated precursors and

determinants" (Neiner & Owens, 1985, p. 127). This idea was prevalent as early as 1944 when Berdie emphasized the influence of family on vocational choice. In fact, according to Berdie (1944), the family may be the single most important factor in determining vocational choice. He came to this conclusion after reviewing several studies and discovering that family factors were among the most effective predictors of vocational interest.

Roe's (1957) theory of vocational choice also noted the importance of the family. She proposed that the family atmosphere experienced during childhood was the major determinant of an individual's career selection. Parental attitudes toward offspring were viewed as crucial in determining family atmosphere. Roe hypothesized that parents can express one of three attitudes toward their children: Concentration (overprotection); Avoidance (neglect); or Acceptance (nurturance). Furthermore, she argues that children who experience an atmosphere of Acceptance or Concentration would enter people-oriented fields, whereas children who perceived an atmosphere of Avoidance would enter nonpeople-oriented occupations.

Thus, Roe outlined a theory in which the child's early experiences with his/her parents are assumed to create basic attitudes and interests, which are given expression in the adult's vocational choice. Unfortunately, the empirical evidence on Roe's theory is equivocal at best (Holland, 1976).

For example, Green and Parker (1965) found that boys showed a person-orientation in occupational choice when parent/child relationships were positive, and girls showed a nonperson-orientation with negative parental relationships. Thus, only a hint of support was found for Roe's hypothesis that a child who experiences warm and loving parents will orient toward occupations involving people, or conversely, that cold rejecting parents will predispose a child to nonperson occupations. On the other hand, in a study of male psychology graduate students, Medvene (1969) reported a significant relationship between early parent/child relations and subsequent occupational choice. Overall, some of the studies have supported the theory, while others have not.

As opposed to Roe, Holland (1959) does not hypothesize so specifically about the possible antecedents of vocational preference and choice. He states that "at the time of vocational choice the person is a product of the interaction of his particular heredity with a variety of cultural and personal forces including peers, parents and significant adults, his social class, American culture, and the physical environment" (p. 35). Holland does not explicitly discuss the manner in which modal personality types develop. Presumably parents provide or deny opportunities for experiences. Parents also influence offspring by their own attitudes and, the more a child resembles a parent, the more reward he/she receives. This notion has been supported by the finding that

a significant relationship exists between parent and child personality types. For women, relationships with parents have been found to have implications for the development of personality types which in turn have an impact on occupational interests and choices (Clarey & Sanford, 1982).

Grandy and Stahmann (1974) tested Holland's hypothesis that parents' personality types foster similar offspring personality development. They compared parental personality types (occupations) with offsprings' personality types (expressed occupational choices). Results revealed a positive relationship between the personality types of father-offspring combinations, but no such relationship was found for mother-offspring combinations. Dewinne, Overton & Schneider (1978) replicated the above study using a larger and more diverse sample. Their findings were similar to those reported by Grandy and Stahmann (1974).

Thus, while relationships between paternal and offspring personality types seemingly exist, the role of maternal personalities remains unclear. Fathers' personality types may carry more weight in the development of offspring types. In addition, the amount paternal and maternal influence may vary according to the gender of the offspring. For example, Block (1973) found that parents, especially fathers, emphasize different values in rearing their sons and daughters. Overall, the data do not consistently suggest either parent as the critical influence of female offspring. Certain studies

support greater closeness with or similarity to mothers, while others stress the importance of the father-daughter bond. Thus, both parents seem to be important (Lemkau, 1979).

Reviewers of Holland's theory agree that the development of types should be made more explicit, and that women need to be studied more thoroughly (Holland, 1987). For example, Brown believes that Holland's theory of vocational choice while the best theory of vocational choice currently available, fails to adequately account for the processes that lead to personality development and fails to deal effectively with questions concerning women. Furthermore, Osipow (1973) urged that "investigators might try and show how experiences in early childhood and adolescence are related to the development of one of the six personal orientations" (p. 78). In other words, Holland does not specify the antecedents that result in or cause a person to adopt one personality type as his/her own over other types.

A review of the determinants of vocational preference

Mumford and Owens (1982) suggest that the current lack of information concerning the measured precursors of various vocational interests might be remedied through the application of biodata techniques and that this information could be of use in attempts to understand the nature and development of vocational interests. In addition, Chaney and Owens (1964) provided empirical data supporting the feasibility of using scored life history data for predicting the development of

vocational interests. Biodata has been found to be an efficient, robust and highly valid predictor of a broad array of practical criteria (e.g., job performance, vocational preference, career choice, and vocational indecision) (Graef, Wells, Hyland & Muchinsky 1985; Owens, 1976). In fact, according to Muchinsky (1990), "if they gave an Academy Award for the 'most consistently valid predictor,' biographical information would be the winner" (p. 124). Furthermore, the available evidence suggests that the major dimensions of biodata response are quite stable across culture, age, race, gender and organization. Thus, there is support for the common axiom that what an individual will do in the future is best predicted from what that individual has done in the past.

According to Klimoski (1973) research relating biodata to occupations may take three general directions: (1) relating life history items to patterns of measured interests; (2) using biographical data for the prediction of successful versus less successful employees while they are in the actual work setting; and (3) developing scoring keys that differentially predict actual vocational choice (i.e., differentiating occupations on the basis of responses to life history items).

Life history data have been used in the realm of vocational behavior research to identify potential determinants of vocational preferences (Graef et al., 1985). For instance, Eberhardt and Muchinsky (1982b) found empirical

support for the hypothesis that one's life experiences play a role in the development of one's vocational preferences. They found that up to 35% of the variance in the subjects' vocational interests was explained by their biodata scores. Therefore, they concluded that vocational preference is predictable from knowledge of life history experiences. However, the authors cautioned that life history measures are self-reported and, therefore, their accuracy may be tainted by memory loss, selective recall, and social desirability. Similarly, results obtained by Mumford and Owens (1982) suggested that there is a close relationship between inventoried interest in an occupational field and past behavior or experiences.

Biographical information has also been demonstrated to be a valid predictor of actual vocational choice (Graef et al., 1985). For example, Neiner and Owens (1985) found that freshmen biodata scores explained 20 to 24% of the variance in the types of jobs (categorized by Holland's RIASEC code) held three to four years after college.

Holland's theory espoused the view that members of a vocation have similar personalities and similar histories of personal development (Neiner & Owens, 1985). This led researchers to use life history information to identify the commonalities in life experiences among members of occupational groups. Overall, the results from these developmental studies suggest that people in different

occupational groups have characteristic histories (Holland, 1976). For example, Albright and Glennon (1961) found several personal history items that differentiated among oil company research scientists who held supervisory positions and those who remained "in the trenches." Kulberg and Owens (1960) examined life history correlates of measured interest in the engineering field and found that persons with engineering interests had a history of: (1) adjustment problems; (2) achievement in science courses; and (3) a desire to work with things and ideas rather than people. In other words, they were able to develop a profile descriptive of the people who have an interest in the field of engineering. Similarly, Nachmann (1960) found that persons in certain occupations differed in their childhood experiences. Klimoski (1973) analyzed three groups of engineers (research and development, management, and nonengineering-engineering positions) and found that groups could be differentiated using biodata response patterns. Thus, not only can life history information be used to identify the similarities in life history experiences among members of occupational groups, it can also be used to differentiate people in very similar vocations.

Life history factors appear to have great utility in developing biodata profiles for clusters of jobs, both within a specific organization and across organizations. Moreover, this would be particularly useful in a situation where a high-

ability person is hired by an organization; both the company and the individual would benefit if he/she were placed in the positions most suited to his/her interests and noncognitive skills. Life history factors are also useful for identifying areas of potential career and academic success for students (Klimoski, 1973). Schoenfeldt (1974) developed an assessment classification model to determine the probability of success and satisfaction in a particular "job family" given that the individual is a member of a particular life history subgroup. He found that life history subgroups of college students, formed on the basis of data collected during the subjects' freshman year, differed with respect to criterion measures (such as type of degree sought, GPA, etc.) taken four years later. Most importantly, these students differed with respect to curricular paths selected during college.

Klimoski (1973) has noted that the increasing need for more efficient human resources has increased the importance of techniques that make fine distinctions in terms of predicting and understanding career development patterns. Specifically, biodata may provide one method of making these fine distinctions.

Life history experiences and women

The socialization of women for adult work roles is extremely complex. At any given time, parents, peers, school and other variables affect a female's personality characteristics, which in turn have an impact on her academic

and intellectual achievement and occupation-related behavior (Ireson, 1978). In addition, the different socialization experiences of men and women result in a more complex pattern of career development for women. Women must contend with factors that are foreign to male vocational development: (1) lower academic self-confidence, competitiveness, and risk taking than men; (2) fear of success; (3) home-career conflict; (4) myths about women and the world of work; and (5) sex-role orientation. Because of these differences, many theorists conclude that adequate information or explanation for the vocational behavior of women is unavailable (Nevill & Schlecker, 1988).

In order to obtain a better understanding of women's occupational behavior many researchers have examined life history experiences. For example, Aneshensel and Rosen (1980) found that background variables were significantly related to occupational expectations of adolescent females. In the same vein, Eberhardt and Muchinsky (1984) found that biodata correctly predicted 51.8% of the female subjects' high-point Holland codes. Moreover, most misclassifications (31%) were only one step removed (adjacent codes). Thus, biographical information may hold a key to the understanding of female vocational behavior.

Other researchers have investigated vocational behavior by examining a variety of demographic variables. For instance, Burlin (1976) investigated the relationship of

parental education and maternal work and occupational status to the occupational aspirations of adolescent females. She found significant associations between a female adolescent's occupational aspiration and her father's education. She also discovered a relationship between a mother's occupational status and the subject's career aspirations. On the other hand, Jenkins (1989) studied women over a 14-year period and found that there were no significant differences among teachers, professors and business women on parents' occupational prestige, family income, father's education, or mother's years of employment. Parents of female engineers, however, have been found to be more likely to have college degrees and to be employed in professional positions than were parents of male engineers (Jagacinski, 1987). The mixed results of studies in this area may be due to the focus, e.g., comparisons of women in different occupations, comparisons of men and women in the same occupation, and both.

Socioeconomic status (SES) is one demographic variable that has received extensive attention in attempts to better understand vocational behavior. For instance, Smart (1989) reported that family SES had a significant indirect effect on the development of Holland's vocational types. Hannah and Kahn (1989) found that high SES females were more likely than low SES females to choose male-dominated occupations. Moreover, the low SES group reported significantly lower self-efficacy expectations than the high SES group regardless of

occupational prestige. With regard to vocational aspirations, Bachman (1970) reported that SES was the most influential family background variable. In short, SES has consistently been found to be positively related to level of vocational aspirations (Schiffler, 1975).

With the recent influx of women into male dominated occupations, many researchers have examined the differences between women who enter traditional (female-dominated) and nontraditional (male-dominated) occupations. After reviewing the literature, Auster and Auster (1981) concluded that women who enter nontraditional careers will more likely than not emerge from an environment in which: (1) the mother works, probably in a high-level, nontraditional occupation; (2) the father is an achievement role model and source of occupational identification; (3) both parents are supportive of their daughter's career orientation; (4) family SES is high; (5) family size is small and she is firstborn or an "earlyborn" among female siblings; and (6) the peer group serves as a supportive influence.

In addition to the environmental variables noted above, several personal variables also have an impact on a woman's career orientation. For example, Greenfeld, Greiner and Wood (1980) found that several personal variables were predictive of whether a woman holds a male-dominated job: (1) college attainment; (2) problems with sexual discrimination; (3) age; (4) feelings toward a high salary; (5) feelings of importance

of work; and (6) feelings about becoming an authority in her job.

Parents of nontraditional women have been found to be better educated, and husbands of nontraditional women often have a significant impact on their career decisions. Nontraditional women were found to have husbands that encouraged entering law school, beginning a business, seeking promotions, and running for public office (Wilson, Weikel & Rose 1982). Furthermore, women in nontraditional vocational programs received consistently more support and encouragement from the important people in their lives when they considered enrolling in these programs than did women who entered traditional programs (Houser & Garvey, 1983). Kenkel and Gage (1983) found that low-income girls tended to choose gender-appropriate jobs when in grade school and high school. In contrast, Peng and Jaffe (1979) utilized longitudinal data and discovered that family influence on women's entry into nontraditional fields is not significant.

In addition to the differences in family background and environmental characteristics that most researchers report regarding women in nontraditional occupations, several researchers have examined personal variables. For example, women in male-dominated occupations have been found to be high on competency traits as well as having background characteristics that foster achievement, e.g., high parental education and firstborn status (Lemkau, 1979). Moreover,

nontraditional women view themselves as more autonomous and self-confident than traditional women (Winters & Sorensen, 1975). Due to a variety of environmental variables, Standley and Soule (1974) discovered that women in nontraditional jobs felt that they were raised as "special" children. They also found that although nontraditional women share common antecedents of their vocational choice (e.g., special status, professional fathers, and well educated mothers), occupational groups were dissimilar on a number of dimensions. Thus, it appeared that some variables were predictive of whether a woman would enter a male or female-dominated occupation, while other variables were predictive of exactly which career she would choose within these categories.

Greenfeld et al. (1980) compared women in male-dominated jobs, female-dominated jobs, and those in sex-ratio balanced jobs. They found that women holding male-dominated jobs tended to rate definitions of success as more important to their feelings of well-being than did women in the other job categories. Moreover, women in male-dominated jobs were more likely to be childless, older, better educated, and have fathers with higher educational attainment than the other women. Women in female-dominated jobs, however, rated the importance of their work higher than did women in male-dominated jobs. In another study that compared women in traditional and nontraditional jobs, Wolfe and Betz (1981) found greater personality-occupational choice congruence, and

thus greater support for Holland's theory, among women in fields traditionally considered more appropriate for males. In contrast, women preferring traditionally female occupations are more likely to make choices incongruent with their Holland personality type.

One major problem with the literature on women in traditional occupations is the measurement of women's career aspirations. For instance, occupations defined as nontraditional may have sub-specialties that do conform to the demands and characteristics of women's traditional role and may be viewed as traditional by the aspirant. This suggests that information about a woman's perception of her future field may be a necessary addition to statements about career goals. In short, traditionality of careers has typically been measured in terms of the percentage of women (or men) in the field; whereas, a more appropriate measure may be the perceived traditionality (Bailey & Mednick, 1988).

Sex-Roles

Theoretical underpinnings

Sex-role orientation is another variable that seems to be of import when examining women's vocational behavior. The existence of sex-role stereotypes, or the belief that men and women differ in many ways, has been convincingly documented. The degree to which these widely held beliefs represent

reality, however, remains controversial (Spence, Helmreich & Stapp, 1975). Established paradigms contend that differences between the sexes are natural, anatomy being destiny. These theories of development and behavior are both descriptive and prescriptive. But during the past few decades, sex-role research has been rapidly emphasizing the need to develop human potential rather than characteristics and roles that have traditionally been sex-specific (Rowland, 1980). Furthermore, evidence from anthropologists on the importance of social and cultural factors in producing behavioral differences between the sexes tends to discredit any biological theory of gender differences (Mead, 1949). Normative sex-role expectations may guide parents' rearing of their children. This may result in sex differences, which, in turn, justify the continuance of these expectations (Spence et al., 1975).

On the other hand, according to L. W. Hoffman (1977), as awareness of the changing female role in our society has increased, sex-linked differences in socialization have diminished, resulting in reduced sex differences. Similarly, the social norm of "gender-appropriate" behavior in this society has changed dramatically over the past decades, lending credence to the idea that sex-role orientation is an important aspect of self perception which should be considered in conjunction with life-history experiences when examining vocational behavior. The fact that assessing differences in

vocational behavior solely on the basis of gender no longer seems appropriate is well evidenced in the increasing amount of research on sex-role orientation.

The original notion of sex-role orientation focused on the notions of masculinity and femininity. However, Constantinople (1973) has criticized three assumptions about the nature of the masculinity-femininity construct: (1) that it is best defined in terms of sex differences in item response; (2) that it is a single bipolar dimension ranging from extreme masculinity at one end to extreme femininity at the other end; and (3) that it is unidimensional in nature and can be adequately measured by a single score. In response, Bem (1979) has asserted that individuals of different sex-roles should be viewed as differing fundamentally "(a) in the content of their beliefs about what the two sexes are like and (b) in their cognitive schemata for processing gender-related information; and hence in the perceptual salience and cognitive availability of gender and gender-related concepts as dimensions for processing incoming information" (p. 1053).

Consequently, much recent research has focused on the hypothesis that masculinity and femininity do not represent opposite ends on a single continuum but rather are independent dimensions. Therefore, it is possible for persons of either gender to endorse <u>both</u> masculine and feminine traits--androgyny. On the other hand, it is also possible that an individual will endorse <u>neither</u> masculine nor feminine traits-

-undifferentiated (Bem, 1981). Androgyny has come to represent the new direction that sex-role research has taken--movement toward the development of individuals and their potential, regardless of their biological sex (Rowland, 1980). Representative of this fact is Keys' (1985) study of Certified Management Accountants (CMAs) in which six of ten general characteristics and career expectations were found to be related to sex-roles. According to Keys, female stereotypes not applicable to women CMAs were applicable to feminine CMAs; androgynous CMAs expected more future success than feminine CMAs; feminine CMAs put less emphasis on their careers, leadership power, and life goals than androgynous or masculine CMAs; and feminine CMAs had stereotypically female life goals and career preferences, and considered themselves as less successful than androgynous and masculine CMAs.

On a more discouraging note, Spence and Helmreich (1980) reviewed the literature and concluded that abstract trait dimensions have only minimal relationships with sex-role attitudes and sex-role behaviors that do not tap instrumentality and expressiveness. Thus, instrumentality and expressiveness per se have important implications--they need to be disentangled from the global concepts of sex-roles or masculinity, femininity and androgyny. Most researchers, however, still embrace the notion of sex-roles and believe that the four orientations described above are indeed valuable constructs.

Research trends

From a developmental perspective, personality traits such as masculinity and femininity would not be expected to remain constant over the life span. In fact, research has revealed that there are age effects on membership in one of the four sex-role categories. Moreover, masculinity was found to be negatively related to age for both genders (MacDonald, Ebert & Mason 1987). While the percentage of androgynous males has been found to increase with age, it decreases with age for females. Fischer and Narus (1981) also found empirical support for the view that androgyny may be an emergent characteristic, which appears later in one's sex-role development. In fact, they found that age-related changes in sex-role development occur well into adulthood within a sample of college students. This age difference may be due to the fact that some of the items on the Masculine scale (e.g., athletic) of the Bem Sex-Role Inventory (BSRI) might be more characteristic of younger subjects. On the other hand, it may be that there is an increased need for expressive traits in adult men.

Many researchers have also reported partial or no support for the developmental perspective of sex-roles. Hoffman and Fidell (1979) found no association between sex-typing and age. In contrast, Tinsley, Kass, Moreland and Harren (1983) found that female college students' occupational decision making processes change as a function of age and progress through

college. In addition, decision making progress seems to cause an increase in androgyny in freshmen women, which in turn has a reciprocal causal impact on decisional status. As their sex-role orientation became more androgynous, women progressed toward making satisfying occupational decisions. However, as women decide to enter female-dominated occupations as seniors, androgyny decreases. Hence the link between vocational behavior and sex-role orientation, although the changes in sex-role orientation may not coincide with the general trend of increasing androgyny with age.

Mixed results have been reported in other studies. Moore and Rosenthal (1980) found that older females are more sex-typed than younger females, but no such results were obtained for men. Noteworthy is the fact that these results may be due to a cohort effect rather than changes in sex-roles associated with aging. Blackman (1986) found that the mean age of female undergraduates enrolled in higher level mathematics was about 10 years lower than that of females not enrolled in math subjects. When the effects of age were removed, however, there were no significant relationships between math enrollment and social and psychological variables. Thus, Blackman concluded, "age reveals something important about the experiences that women encounter in growing up" (p. 39). This notion is particularly important in the present study because it reveals a theoretical rationale for examining sex-roles in conjunction with life history experiences.

Shifting attitudes toward women's sex-roles

Other researchers have focused on assessing the changes that seem to be occurring in sex-role attitudes. Tallichet and Willits (1986) found that there were liberal shifts in sex-role attitudes of women between 1970 and 1981. Further, adolescent attitudes were related to mother's education and subjects' later educational attainment. There was also a positive relationship between attitude change and employment, income, and education. Similarly, Helmreich, Spence and Gibson (1982) reported large and significant shifts toward egalitarianism between 1972 and 1976 among both students and their parents. However, female students showed a small but significant shift in the conservative direction between 1976 and 1980, while both sexes endorsed vocational and educational equality, perhaps reflecting the impact of affirmative action programs and the increasing numbers of women who are entering professions from which they were once effectively excluded. Women's labor market participation may also be responsible for increased acceptance of the idea that men should share domestic responsibilities.

In contrast, McBroom (1987) reported that men and women became significantly less traditional between 1975 and 1980, although women significantly more so than men. For women, entry into marriage, not employment was associated with less traditionalism. Thus, for married women, role demand seemed to have an important effect. For men, continuation in

marriage, not marriage itself, was associated with lowered traditionalism. On the other hand, Aneshensel and Rosen (1980) found that women who plan to marry and have children are likely to view the sexes in stereotyped ways and believe that men and women should occupy different occupational and domestic roles. Women who did not expect to marry were the most likely to hold liberal sex-role attitudes. Haworth, Povey and Clift (1986) found that women had more liberal attitudes towards the role of women in society than did men.

Moreover, it was discovered that the attitudes of women are independent of the sex-typing of their occupation. Durkin, Zaveri and Condor (1986) examined women's sex-role attitudes in conjunction with their own sex-type. They found that sex-role attitudes of women were related to their own sex-role orientation. In particular, androgynous women held more liberal attitudes than feminine women.

Several researchers have also examined sex-role stereotypes rather than sex-role attitudes. For instance, Ruble (1983) conducted a study which revealed significant differences in 53 of 54 items used to describe typical men and women. This implied that the stereotypes of the sexes remained strong in the 1970s. However, descriptions of desirable men and women yielded significant differences on only 12 of 54 items. Thus, while attitudes seem to have changed in the 1970s, stereotypes remained stable. In a similar study, Lewin and Tragos (1987) compared attitudes of

adolescents toward sex-role stereotyping in 1956 with the attitudes of youth in 1982 and found no significant differences. Girls, however, showed less dissatisfaction with being a girl in 1982 than in 1956, representing an improved self-image of girls over the 26-year period. In contrast to the media's portrayal of an increasing overlap in attitudes and behaviors once thought to be exclusively masculine or feminine, therefore, empirical studies reveal that traditional sex-role stereotypes not only exist, but have been remarkably stable over the past two decades (Goldberg, 1975)

When addressing the issue of sex-role stereotypes, one should note that the goals of femininity and competence are not necessarily the same. Therefore, little is known about how to rear females to be competent, partly because competence, especially intellectual competence, may not be an important goal for females in our society (Sherman, 1976). Regardless of our questions of how to rear competent women, attitudes towards female competency and academic choices have shifted. For instance, Bustamante and Chang (1975) conducted a study of male and female college students. They reported a trend toward flexible sex-roles for women, with an increasing social acceptance of females who succeed in traditionally masculine domains. In addition, women seemed to expect positive consequences for scholastic success. Research involving college students also revealed a relationship between sex-roles and choice of major. Individuals who

described themselves as possessing instrumental traits were more likely to pursue male-dominated fields than were individuals who did not (Buri, Kirchner & Walsh 1987).

In summary, there are numerous indications that changes in sex-roles have occurred in American society. In particular, changing patterns of employment reflected the heightened occupational aspirations of women. For example, there has been a steady increase in the number of women participating in the labor force. Furthermore, more women are attending college, including professional schools such as medicine, law and business. As a result, women today are less likely to perceive that their role options are limited to wife and mother (Ruble, Cohen & Ruble, 1984).

Sex-role research and women

Many people allot some of the credit for the recent changes in sex-role attitudes in this country to the Women's Liberation Movement. As Kearney (1979) stated, "[T]he Women's Movement has provided feminist challenges to common assumptions about the 'proper' role of women" (p. 22). Despite the media's acceptance of the women's liberation movement, subtle differences persist in the portrayal of men and women. For instance, Sternglanz and Serbin (1974) performed an observational analysis of male and female role models presented on 10 popular children's television programs. They found that males were portrayed as more aggressive and constructive than females, while females were more likely to

be portrayed as dependent. Also, females were more often punished for high levels of activity than males. Overall, they found large sex differences in the visibility of male and female characters and in the roles to which they were assigned.

Other researchers claim that interest in sex-roles has greatly intensified as a direct result of the Women's Movement (e.g., Pedhazur & Tentenbaum, 1979). Hoffman and Fidell (1979) reported that masculine women seemed to exhibit a feminist pattern in their vocational choices, while feminine women exhibited a more conservative, traditional approach. Androgyny was found to be related to feminism in that androgynous women had more liberal views about the roles of women than did feminine women. Holland (1976) also concluded that the vocational preferences of women were attributable, in part, to differences in sex-roles. Finally, Zuckerman (1981) found that college women expressed significantly more nontraditional educational and career goals and sex-role attitudes than women in previous studies, nontraditional attitudes being predictive of educational and career goals.

Like Zuckerman, many investigators have utilized college students in order to better understand women's vocational behavior. In support of this trend is the fact that several studies have shown a close relationship between college major and occupation several years later (Holland, 1976). Clarey and Sanford (1982) reported that androgynous and feminine

female undergraduates sex-role identities related to their preferences for a traditional or nontraditional career. In addition, Rea and Strange (1983) found that most women enrolled in same-gender majors reported a feminine sex-role orientation and that the largest proportion in cross-gender majors reported a masculine sex-role. Even though sex-role and traditionality of college major were found to be significantly related, women reported assigning less importance to the consideration of a major's sex-appropriateness in making their decision. This suggested that while congruence of sex-role and vocational choice was important, it might not have been part of a student's conscious career decision-making process (Strange & Rea, 1983). Moreover, Wolfe and Betz (1981) found that masculine typed college women were more likely to make career choices that were congruent and in traditionally masculine fields than were feminine-typed, androgynous, or undifferentiated female students. This lead to the suggestion that masculine sex-typing in women might have facilitated the selection of nontraditional career fields, which, in the view of the strong relationship of nontraditionality of choice to congruence, would increase the probability of making choices congruent with Holland personality orientation.

The recent upsurgence in interest regarding women's role in our society has lead many researchers to examine the relationship between sex-roles and vocational choice. In

general, sex-role has been found to be related to the selection of a field of study or an occupation. However, previously restricted and rigid sex-role norms have dissipated somewhat in the past decade, and increasing numbers of males and females have entered nontraditional fields (Rea & Strange, 1983). According to Aneshensel and Rosen (1980), a woman's decision to enter traditionally "female" occupations varies with her commitment to conventional and domestic roles. Thus, the more a woman engages in sex stereotyping the less likely she was to pursue a career in a nontraditional field. Furthermore, "traditional sex-role stereotyping appears to reinforce homemaking rather than career orientations in women" (Goldberg, 1975, p. 102).

Researchers have also discovered that sex-roles are related to past occupational preferences, with masculine women showing a pattern of nontraditional career desires (Yanico, 1981). By studying men in female dominated professions, Lemkau (1984) took a slightly different approach in her research. She found that men in atypical professions had a lower adherence to traditional sex-role expectations than did men in sex-typical fields. In a study of both men and women, college students majoring in sex-inappropriate fields endorsed less traditional sex-role attitudes than students majoring in sex-appropriate fields (Ruble et al., 1984). In contrast, Lyson and Brown (1982) found that sex-role ideology was only weakly associated with curriculm choice, but was related to

career ambitions for women in sex-typical and sex-atypical areas of study.

In his review article, M. L. Hoffman (1977) notes several areas of sex-role development research and the findings associated with each of these areas: (1) Achievement and Fear of Success--no data were available to suggest that males are more motivated to achieve than are females, although males may place greater value on achievement; (2) Sex Differences--the only areas where sex differences have been documented are that males have been found to be more aggressive in terms of intent to harm others and males in early adolescence become more competent in visual spatial skills and math skills, and less competent in verbal ability (a genetic component is suggested); and (3) Sex-Role Preference and Personal Adjustment--it has been found that traditional sex-role socialization may not be conducive to adjustment, while androgynous socialization has been found to best equip people to handle changing role demands throughout the life cycle. The last area of research, that of socialization, seems to warrant further consideration in terms of women's vocational behavior. One finding of particular interest is that both academic achievement and the occupational aspirations of young women have been found to be adversely affected by socialization for femininity (Ireson, 1978).

Sex-role socialization

Women who are socialized for femininity in this culture seem to suffer many disadvantages. These disadvantages become clear when one examines the stereotypical female sex-role in our culture. According to Sherman (1976), the female sex-role in our culture inhibits aggression and an open display of sexual urges, while it encourages passivity with men, nurturance, physical attractiveness, emotional responsiveness, social poise, and a friendly posture with others. Ireson took a more negative view when she assigned the sex-roles associated with women into two major groups: "(1) incompetence (for example, dependence, submissiveness, passivity and low self-confidence); and (2) warmth and emotional expressiveness (for example, talkativeness, gentleness, tactfulness, awareness of others feelings, and the ability to express tender feeling" (p. 178).

On a similar note, Cole (1986) found that the low proportion of women in medical school prior to the 1970s was due to sex-role socialization that influenced women not to aspire to careers in medicine rather than direct discrimination by medical schools. Historical data suggested that as far back as 1929 women had just as good of a chance of being accepted into medical school as did the male applicants.

"It has long been acknowledged that sex-role socialization is a major factor underlying the particular vocational choices that men and women make as well as the

range of options considered" (Neimeyer, Brown, Metzler, Hagans & Tanguy, 1989, p. 239). More specifically, masculinity is correlated with a stronger career orientation, and a greater willingness to enter male-dominated occupations. Aneshensel and Rosen (1980) claimed that women gravitate toward traditional jobs due to traditional sex-role socialization and conventional domestic expectations in adolescence. From a young age, traditionally socialized females are taught that their destiny is to be a wife and mother, and that these roles should take precedence over occupational roles. Expectations thus become channeled into jobs which offer accomodations to domestic roles (e.g., part-time work)--typically middle-status, low paying, traditionally female occupations.

Similarly, the belief that being responsive, helpful and supportive will lead to marriage may predispose these women to people-oriented, "female" occupations. In contrast, Herzog and Bachman (1982) found that sex-role attitudes have little bearing on the status and prestige that a woman aspires to in her work. Sex-role attitudes were only critical in the decision to enter the work force and in the importance placed on labor force participation.

Researchers have also examined these issues by comparing women in different occupational (or academic) groups and by comparing men and women in the same situations. For instance, Galejs and King (1983) found that female engineering students scored significantly higher on work incentives, promotions,

and incisive and diplomatic actions, while social science students scored higher on feminine, family-related, and work-flexibility factors. Engineering students indicated a significantly higher need for having children and being good mothers, but preferred smaller families than social science students. Also, more engineering students were firstborns and came from larger cities. Shann (1983), on the other hand, reported that the plans of women pursuing professional training were not significantly different from those of male colleagues. However, significant differences were found between men and women in traditionally feminine fields. These finding suggest that women in nontraditional fields reject culturally defined sex-roles and exhibit some of the same needs, motives, and values of men in masculine fields.

Recent research has also shown a trend toward relating sex-role orientation to life history experiences. This trend may signify the desire to better understand the socialization processes that lead to the seemingly more desirable sex-role orientations (i.e., androgyny and masculinity). Mumford and Owens (1982), for instance, found that females who reported an interest in science were more capable of rejecting the social pressures of adolescence and exhibited a more mature and slightly more masculine pattern of behaviors. Athletic interests, scientific interests, popularity with the opposite sex, and participation in cultural and religious activities have all been found to be related to an individual's sex-role

(Kelly & Worell, 1977). Furthermore, Hansson, Chernovetz and Jones (1977) found that daughters of employed mothers were most likely to be androgynous. Androgynous females, as compared to sex-typed females, have also been found to have moved more frequently during childhood, been raised in larger communities, had fathers and mothers of higher occupational status, tended toward higher educational aspiration, desired fewer children, and placed more importance on competence at work (Allgeier, 1975).

Social class and education also seem to influence sex-role stereotypes. Parental roles in middle-class families are reportedly less differentiated than in lower-class families. Also, one study found that the older and better educated a mother was, the less she insisted that boys behave in a masculine manner and that girls exhibit feminine traits (Rosenkrantz, Vogel, Bee, Broverman & Brovermen, 1968). Kelly and Worell (1976) found that reported parental affection principally differentiated male sex-role orientations, whereas parental cognitive or achievement encouragement and permissiveness differentiated female sex-role categories. Johnson (1963), on the other hand, suggested that identification with the father was crucial for producing appropriate sex-role orientations in <u>both</u> males and female. However, children have been found to imitate same-sexed models when other variables are held constant, although females cross over more than males (Hoffman, M.L., 1977).

Zuckerman (1981) reported an absence of a predictive relationship between a mother's employment status and children's goals and attitudes. Instead she found that several variables predict specific goals or feminist attitudes, suggesting that many of the background variables that predicted specific role preferences in previous studies are no longer significant predictors for today's college students. This may be indicative of the changing attitudes towards women's educational and work roles. Keith (1988) suggested that future research investigate whether maternal employment in high-status occupations serves as a negative model for boys while providing a wide range of acceptable models for girls.

In conclusion, sex-role research is currently a very vital and growing area for psychologists. This fact is best evidenced by the devotion of an entire professional journal to the topic, Sex Roles. Overall, sex-roles have been found to be a very important aspect of the self-percept to examine in relation to vocational behavior. In particular, due to the changes in sex-role orientations over the past several years this construct may be critical in the examination of female vocational behavior. Of secondary importance to this investigation is the fact that sex-role orientation has also been found to be related to biographical information. Thus, more than ample justification exists for considering sex-roles in conjunction with life history experiences so that the

changing face of women's vocational behavior can be better understood.

Self-Esteem

Self-esteem defined

Self-esteem is the final variable that will be examined in relation to female vocational behavior in the present study. First self-esteem must be defined. The hypothetical concept of self-esteem has attracted a number of discrepant definitions, each reflecting the theoretical stance of the writer. Self-esteem has been categorized as an attitude, a need, an index of mental health and as a moderating variable (Robson, 1988). In addition, the terms self-esteem and self-concept have been used interchangeably. Therefore, these two constructs must be defined and differentiated while understanding that these differences may not always be utilized in the literature. Self-concept is the descriptive perception of the self in various roles and is only judgmental in that one may qualitatively assess one's role performance (Beane & Lipka, 1980).

Another popular definition of self-concept was touted by Rogers (1951). He defined self-concept as "an organized configuration of perceptions of the self which are admissible to awareness. It is composed of such elements as the perceptions of one's characteristics and abilities; the

percepts and concepts of the self in relation to others and the environment; the value qualities which are perceived as associated with experiences and objects; and goals and ideas which are perceived as having positive or negative valence" (p. 136).

On the other hand, self-esteem is the valuative assessment one makes regarding satisfaction with role(s) and/or the quality of performance (Beane & Lipka, 1980). In the same vein, Burns (1979) defined self-esteem as the process by which the individual examines his own performance, capacities, and attributes according to his personal standards and values, which have been internalized from interactions with society and significant others. Finally, Coopersmith (1967) defines self-esteem as:

> the evaluation which the individual makes and customarily maintains with regard to himself. It expresses an attitude of approval or disapproval, and indicates the extent to which the individual believes himself to be capable, significant, successful, and worthy . . . . Self-esteem is a personal judgment of worthiness that is expressed in the attitudes that the individual holds toward himself. It is the subjective experience which the individual conveys to others by verbal reports and the other overt expressive behavior. (p. 4)

Moreover, some researchers propose a global concept of self-esteem while others prefer a multifaceted model (Robson,

1988). Wells (1988) suggested that self-esteem is a complex phenomenon that requires several types of measurement procedures. She found that depending upon whether self-esteem was measured as an ongoing process or by standard self-esteem measures, the views of self-esteem will differ and are not interchangeable. Thus, self-esteem may fluctuate depending upon whom the subjects are with, for example, and is, therefore, related to aspects of one's interpersonal situation.

There is also some controversy over the question of whether self-esteem is a stable construct. There are two general points of view. One view holds that self-esteem is a relatively stable personality trait formed by the end of the adolescent years. Self-esteem is believed to be susceptible to change mainly through major life changes such as divorce, and losing one's job, but otherwise self-esteem remains constant throughout the years of adult working life. The second viewpoint is that self-esteem is a less enduring trait and that it can be altered by less traumatic events (Tharenou, 1979). Thus, despite the voluminous amount of literature that has accumulated, a clear consensus as to the meaning of self-esteem is still lacking. Some see self-esteem as stable and enduring, yet it has been shown to be susceptible to a number of experimental manipulations, and age seems to account for some variance (Robson, 1988).

Self-esteem's relationship to vocational behavior

Self-esteem and self-concept have been related to vocational behavior by a large number of researchers. For instance, Super (1972) viewed a person's vocational preferences and career patterns as attempts to implement his/her self-concept. "In short, the self-concept plays a central role in making vocational decisions because it is a product of a person's vocational maturity level, his developmental history with its specific successes and failures in dealing with societal hurdles and experiences" (p. 38). In addition, the concept of vocational development and preference has often been referred to as the implementation of the self-concept. Thus, there is clearly some interaction between the self-concept and vocational decision (Winters & Sorensen, 1975). Crook, Healy and O'Shea (1984) reported that self-esteem facilitates the development of mature career attitudes, which in turn promotes academic and work achievement. In summary, the research currently available clearly indicates that there is ample reason to examine self-esteem and/or self-concept when investigating vocational behavior.

When examining self-esteem, not only is understanding its definition important, but one should be familiar with some of the theories of self-esteem as well. For example, according to the self-consistency theory of self-esteem, an individual's actions and attitudes are affected by a tendency to create and maintain a consistent cognitive state regarding his/her

evaluations of himself/herself. Therefore, the prediction from this theory is that high self-evaluators will react more favorably to approval than to disapproval and that low self-evaluators will react more favorably to disapproval than to approval. On the other hand, the self-esteem theory assumed that the individual has a need to enhance his/her self-evaluation and to increase, maintain, or confirm his/her feelings of personal worth and effectiveness. According to this theory, low self-evaluators will respond more favorably to positive evaluations from others and more unfavorably to negative evaluations from others as compared to high self-esteem individuals. This follows the assumption that low self-esteem individuals have greater needs for esteem enhancement (Jones, 1973).

In relation to occupational behavior, the consistency theorists may propose that low self-esteem individuals would gravitate toward nontraditional jobs due to the lower need satisfaction in these positions. On the other hand, theorist who espouse the self-esteem theory may propose that high self-evaluators gravitate toward nontraditional jobs because they take more confidence and they are less influenced by external forces. Thus, it becomes clear that these theories espouse entirely different points of view. In a review article, Jones (1973) found that in general, the self-esteem theory is favored over the self-consistency theory. However, some data do seem to support the self-consistency theory, so no firm

conclusions can be drawn.

Self-esteem has also been found to be related to one's occupational orientation. Individuals with low self-esteem were more inclined to avoid positions that made them: (1) subordinate to others; (2) superordinate to others; or (3) compete with others. In other words, they wanted to avoid power and conflict (Rosenberg, 1965). Moreover, Korman (1967) found that high self-esteem subjects were more likely to choose occupations that they perceived as requiring higher abilities than those with low self-esteem. Thus, self-esteem was viewed as a moderator on the choice of occupational roles. That is, high self-evaluators were more likely to seek occupations in keeping with their own self-percept than were low self-esteem individuals.

There is also a wealth of information available on the relationship between self-esteem and occupational attainment and potential. For instance, Wirtenberg and Nakamura (1976) claimed that occupational potential has three components: (1) self-esteem; (2) interest or motivation to aspire; and (3) preparation for a range of occupations by the gradual accrual of knowledge, training and skills. In addition, Holland (1959) proposed that occupational level was a function of intelligence and self-evaluation, where self-evaluation is a function of socio-economic origins, need for status, education and self-esteem. However, in a longitudinal analysis of young men, Bachman and O'Malley (1977) concluded that self-esteem

during high school had little or no direct causal impact on later educational and occupational attainment. Also, occupational status had a direct positive impact on self-esteem, but post high school educational attainment had no direct impact on self-esteem and only a trivial indirect impact via occupational status.

Despite the support for the theory that occupations are chosen on the basis of implementation of a self-concept, many writers have pointed out that there are other factors that have an impact on occupational choice and attainment (Korman, 1966). For example, Paterson (1962), suggested that vocational aspirations are determined by an individual's relationship with parents, spouses and friends. Thus, the next logical step is to examine the acquisition of self-esteem. In determining the antecedents of self-esteem, some of the other factors that have an impact on occupational choice and aspiration may become more apparent.

Self-esteem and life history

According to Beck (1967), an individual acquires his or her self-esteem from personal experiences, the judgments made by others, and from identification with family and friends. Coopersmith (1967) also identified what he believed to be clear antecedents of high self-esteem in childhood. These were: (1) unconditional acceptance of children by their parents; (2) clearly defined and enforced limits to behavior; (3) respect and latitude for independent action within the

defined limits; and (4) high parental self-esteem. The major components of self-esteem, according to Coopersmith, were a sense of competence, significance, virtue and power. Furthermore, there is some evidence that girls gave more weight to approval of others in the development of self-esteem. Similar to Coopersmith's first antecedent, one modern psychodynamic theory of self-esteem claimed that infants born into a home in which they were irrationally adored developed feelings of significance and worth. Eventually a basic sense of self-approval became a part of these children's personality (Robson, 1988).

Several biodata factors have also been reported as important in the development of self-esteem. For instance, Bachman (1970) reported that family relations were positively correlated with self-esteem, academic success and sociability for adolescent boys. Sanford and Donovan (1984), on the other hand, reviewed a large number of studies on women and self-esteem to compile their book. They discovered that parents, family, friends, religion, and formal schooling all have an impact on the development of self-esteem. Families of children with high self-esteem have been found to exert greater demands for academic performance and excellence than families with low self-esteem children. In addition, self-esteem was higher among firstborn and only children than others (Coopersmith, 1967). In contrast, Rosenberg (1965) reported that the child's birth order in the family was not

associated with self-esteem. What did appear to make a difference was whether the subject had any siblings. Only children were reported to have higher self-esteem than others. Family size, however, was unrelated to self-esteem (Coopersmith, 1967).

Some additional life experiences that have been examined include maternal employment status, socio-economic status (SES) and relations outside of the family. For instance, Miller (1975) found that there was no difference in self-esteem levels for daughters of working and nonworking mothers. With respect to relations outside of the family, Rosenberg (1965) found that participation and leadership in high school were related to self-esteem. More generally, Coopersmith (1967) reported that children with high self-esteem were more likely to have good social relations with nonfamilial peers. Regarding SES, some studies have found economic status to be correlated with high self-esteem. However, other literature concluded that lower economic status subjects had <u>higher</u> self-esteem than upper SES subjects. Still other studies found that persons of different economic status had similar levels of self-esteem (Housley, Martin, McCoy, Greenhouse, Stigger & Chopin, 1987).

Parent-child relationships have also garnered much research attention. Psychologists who have examined this area reported that parental attention and concern were related to self-esteem (Rosenberg, 1965) and that self-esteem was

associated with maternal acceptance and the setting of firm realistic limits for behavior (Coopersmith, 1967). More specifically, Growe (1980) reported nine significant correlations between dimensions of parental behavior and self-esteem for boys, but only three such correlations for girls. Greater support and milder punishment from mothers enhanced the self-esteem of children of both sexes and children who perceived their mother's behavior towards themselves as expressing a positive evaluation tended to internalize this view. Growe's finding that a mother's controlling behavior was negatively related to girls', but not boys', self-esteem was a novel one. Buri et al. (1987) also found that parental nurturance was significantly related to children's self-esteem. Regression analyses reveled that maternal and paternal nurturance together accounted for 33% of the variance.

Sex-roles and self-esteem

Recently, many researchers have focused on determining whether sex differences exist in self-esteem and on determining the causes for any differences that may be found. One reason for this new focus is that sex differences on self-perceptual variables might be responsible, in part, for the lower occupational achievements of females as compared to males. The majority of studies document lower expectancies of females in a variety of tasks. While different expectancies are evident by age six or seven, the question of when these

differences emerge has not been carefully examined (Parsons, Ruble, Hodges & Small, 1976). Darley (1976) argues that to understand women's apparent lack of achievement, social, rather than genetic or personality variables should be analyzed. She examined role behavior and role clarity and stability. She found that in particular situations women chose to avoid behaviors that might make them appear to be filling male-appropriate roles. In addition, differences in the clarity and consistency with which sex-roles were defined were related to differential levels of achievement.

Due to the problems associated with our explanations of women's vocational behavior several researchers have supported self-efficacy theory. According to this theory, a person's beliefs concerning his/her ability to successfully perform a given task or behavior was viewed as having a major impact on his/her vocational behavior. Research has revealed the relevance of self-efficacy beliefs to a wide range of behaviors, such as perceived career options, occupational preferences and willingness to embark on nontraditional career paths (Nevill & Schlecker, 1988). Betz and Hackett (1981) found significant and consistent sex differences in self-efficacy with regard to traditional versus nontraditional occupations. For females, there was a significant difference in self-efficacy levels for the two classes of occupations. No such difference, however, was found for males. Females reported significantly higher levels of self-efficacy with

regard to traditional occupations and significantly lower levels of self-efficacy with regard to nontraditional occupations.

Other research on women's vocational behavior has suggested that how a woman views herself (her self-esteem) is a potent variable in determining the likelihood of seeking and being committed to employment (Winters & Sorensen, 1975). Recent research has also focused upon the relationship between self-esteem and a woman's choice of traditional or nontraditional types of employment. Bailey and Mednick (1988) found that self-esteem was higher for women in nontraditional jobs. Moreover, it was also discovered that the reason for career choice was related to self-esteem. Women who entered their occupation for self-oriented (nontraditional) reasons had higher self-esteem than those who entered their fields for other-oriented (traditional) reasons. Thus, it was concluded that the reasons for a woman's career aspirations are as important as the gender composition of the field.

Similarly, women majoring in sex-inappropriate fields were more confident than women who preferred sex-appropriate fields (Ruble et al., 1984). Another interesting finding is that female business executives had higher self-esteem than nonexecutives matched on age and education level (Lemkau, 1979). In contrast to the above results, Zuckerman (1980) found that father's educational attainment was not related to nontraditional goals, nor was parents' occupational status,

self-esteem or women's birth order. However, age, grade, religious upbringing, college major, enrollment in women's studies courses and mothers educational attainment were predictive of nontraditional career goals.

The myriad of studies of women and self-esteem give the distinct impression of women sensing that they are not quite as good, not quite as able, not quite as bright, and not quite as valuable as men (Sanford & Donovan, 1984). Therefore, many researchers have tried to examine why women expect less from themselves than they do from men. For example, Eccles (1987) suggested that achievement-related choices are related to the individual's expectations for their performance on various tasks and their perceptions of the importance of these various achievement tasks. In addition, Parsons et al. (1976) examined three cognitive-perceptual factors of differential expectations of males and females: (1) perception of the experiences of significant others; (2) perception of one's own abilities; and (3) emerging causal attributions for success and failure. They suggested that by age five children have developed clearly defined sex-role stereotypes and that children do appear to monitor their behavior in terms of sex-role labels. Acceptance of these stereotypes seems to necessitate a lower expectancy for females on a whole array of tasks (i.e., males are strong and competent while females are weak and incompetent).

Keith's (1988) findings that positive evaluations of the

self were related to nontraditional sex-role stereotypes among females are supportive of the above contentions. In contrast, Stafford (1984) found no evidence that women's sex-role stereotypes are related to their self-esteem. However, a woman's attitudes toward women's roles were important in determining her vocational behavior. Based on the mixed results available, Yanico (1981) suggested that attitudes toward women's roles may be a mediating variable between more central self-concept variables and actual career choices. In a similar vein, Hoffman and Fidell (1979) suggested that the life circumstances of women should be taken into account, as well as their attitudes and values to understand adjustment (frequently defined in terms of the level of self-esteem).

A number of investigators have examined the relationship between sex-roles and the self-esteem of women. The research is pertinent to a discussion of factors related to career versus noncareer orientation, particularly in light of Super's (1957) well-known axiom that vocational choice involves the implementation of many self-concepts, i.e., the translation of self-concepts into occupational terms. Research has revealed the direct implication that an individual's conception of sex-roles will significantly influence behavior and self-evaluation (Goldberg, 1975). For example, Rosenkrantz et al. (1968) found that college men and women had self-concepts that were very close to their respective sexual stereotypes. In addition, since the feminine stereotype was less socially

desirable than the masculine stereotype, women reported lower evaluation of their self-worth relative to men.

Furthermore, Keith (1988) found that future work and family plans were closely tied to the sex-role orientations of adolescents of both genders. However, self-esteem and projected childlessness were salient to the sex-role attitudes of females, but not males. Finally, Erdwins, Tyer and Mellinger (1980) found that adult women who returned to school did not have higher self-esteem or achievement motivation than full-time homemakers. However, the full-time homemakers described themselves as more feminine than did the returning students. Thus, there are no conclusive finding associated with this line of research. Use of different measures or constructs in studying self-esteem may be related to such discrepant findings, since the complexity of the conceptualization of a self-esteem construct is inevitably related to differences in the measuring instruments (Dorgan, Goebel & House 1983).

Adjustment has been another psychological construct of interest in recent years. Many psychologists are interested in the relationship between sex-roles and adjustment (self-esteem). Many theorists (e.g., Bem, 1979) have maintained that androgynous individuals should be superior in many ways to sex-typed (i.e., feminine females and masculine males) individuals. The logic was that androgynous persons had the flexibility to utilize both masculine and feminine skills when

called for (Lundy & Rosenberg, 1987). For example, Bem (1979) proposed that for fully healthy functioning, masculinity and femininity must be balanced into a truly androgynous person. Thus, androgynous individuals should experience greater psychological well-being, maturity, and freedom from pathology in comparison to sex-typed individuals. Investigators testing this hypothesis have frequently used measures of self-esteem to assess psychological well-being. The next step is to examine some of the literature available on this fascinating topic.

Deutsch and Gilbert (1976) found support for the prediction that good adjustment and androgyny are related, and that poor adjustment and sex-role stereotyping are related, for females. In their view, the typical college woman saw herself as slightly feminine, wanted to be more androgynous, but believed that she would be more desirable to men if she was extremely feminine. Also, the few females who described themselves as masculine were well adjusted relative to other women. Similarly, Heilbrun and Fromme (1965) found that adjusted female adolescents identified most with low-feminine mothers, and maladjusted female subjects identified closely to high-feminine mothers. "Taken together, research from these varied areas indicates that meeting the ideal of stereotypic femininity is not good for the mental health, motherhood, marriage, or intellectual development" of young women (Sherman, 1976, p. 185). In contrast, Rey and Sheppard (1981)

state that "it is not that characteristics associated with femininity inversely relate to self-esteem but that the absence of any characteristics defined as masculine yield a relationship with self-esteem that approaches zero" (p. 165). Thus, not all research has supported Bem's notion that androgynous individuals are higher in self-esteem than sex-typed or undifferentiated individuals.

Models of self-esteem

Due to the mixed results reported above, three models have recently been used to examine the relationship between sex-role orientation and self-esteem. The first model is referred to as the congruence model. This model holds that self-esteem is fostered only when one's sex-role orientation is congruent with one's gender. Thus, support for this model requires that the effects of masculinity and femininity each interact with gender in the appropriate manner. Second, the androgyny model proposed that self-esteem was maximized when one's sex-role incorporates a high degree of both masculinity and femininity regardless of one's gender. In other words, masculinity and femininity each contribute positively to self-esteem. Finally, the masculinity model hypothesized that self-esteem is a function of the extent to which one has a masculine sex-role orientation. Support for this model suggests a positive effect of masculinity but a negative or non-effect of femininity. Whitley (1983) conducted a meta analysis of these three models and found the most support for

the masculine model. Bassoff and Glass (1982) also conducted a meta-analysis. They examined 26 studies and reported that masculine and androgynous subjects had higher levels of mental health than did their feminine counterparts. Thus, once again mixed results have been reported in the area of self-esteem and sex-role research.

Other researchers have proposed a fourth model to describe the relationship between masculinity and femininity and self-esteem--the interactive androgyny model. This model posits that androgyny is more than the sum of masculinity and femininity. The masculinity/femininity interaction is proposed to contribute positively to self-esteem beyond the contributions of masculinity and femininity. In a study of the four theoretical models of the masculinity, femininity, self-esteem relation Marsh, Antill and Cunningham (1987) found consistent support for the masculinity model. The effect of masculinity was statistically significant and positive across four sex-role inventories, whereas the effect of femininity was either not significant or significantly negative. When social desirability was controlled for, the effect of masculinity was less positive and that of femininity was more negative. Thus, support for the masculine model remained strong even when social desirability was added into the regression equation, and the lack of support for the other models was unaffected.

An ominous amount of research has been conducted on the

relationship between sex-roles and self-esteem. A large amount of this research supports the masculinity model (e.g., Antill & Cunningham, 1980; Prager, 1983). For instance, Antill and Cunningham (1980) found that self-esteem increased from the feminine to masculine categories on three different sex-role instruments. Moreover, masculine individuals were higher in self-esteem than androgynous individuals in almost every case. On the other hand, a large amount of the research has also shown support for the androgynous model (e.g., Chow, 1987; Heilbrun, 1981; Hinrichsen, Follansbee & Ganellen, 1981; Puglisi & Jackson, 1980; Rey & Sheppard, 1981; Spence et al., 1975).

Several researchers have also reported support for both the masculinity and the androgynous models (e.g., Adams & Sherer, 1982; Moore & Rosenthal, 1980; Willemsen, 1987). For example, Lamke (1982b) reported that masculine and androgynous adolescents had higher levels of self-esteem than feminine and undifferentiated individuals. Moreover, the effect of sex-roles on self-esteem was greater for females than males and only masculinity independently predicted self-esteem.

Furthermore, masculinity was predictive of self-esteem for females regardless of the instrument used to measure sex-role orientation. In addition, several studies have revealed that regardless of the self-role orientation associated with the highest levels of self-esteem, undifferentiated subjects report the lowest levels (e.g., Hinrichsen et al., 1981;

Puglisi & Jackson, 1980; Spence et al., 1975). Thus, self-esteem has failed to consistently discriminate between androgynous and masculine typed groups. Instead, research has demonstrated that, for both sexes, better self-esteem is found among those with androgynous and masculine sex-role orientations than among feminine and undifferentiated persons.

As is evidenced by the plethora of research cited above, self-esteem may be an important psychological construct to examine in relation to women's vocational behavior. Self-esteem's intriguing relationships with sex-roles and life history experiences add to its value in the present study.

The Present Study

The primary emphasis of this investigation was to understand the basis of the vocational preferences expressed by women. While the research literature has shown that men and women exhibit different vocational preferences, we have scant information on the prediction of vocational preferences. After carefully examining the literature on vocational preference, I decided to examine the predictive powers of three psychological constructs in relation to Holland's vocational typology. Therefore, the primary purpose of this study was to assess the relationship among biodata, sex-role, self-esteem and women's vocational personality types according to Holland's RIASEC typology.

For purposes of this investigation, it was hypothesized that the biodata factors, in conjunction with sex-roles and self-esteem, would account for a significant amount of the variance in Holland's personality types. It was further hypothesized that any one of the three psychological constructs (i.e., biodata, sex-roles and self-esteem) would be predictive of Holland's personality types.

Many other relationships among the three psychological constructs and Holland's personality types were explored. Specifically, nine additional hypotheses were examined: (1) self-esteem is inversely related to the Artistic (predominantly female) Holland personality type; (2) self-esteem is positively related to the Realistic (predominantly male) Holland personality type; (3) masculinity is positively related to the Realistic Holland personality types; (4) femininity is positively related to the Artistic Holland personality types; (5) freedom from parental control is positively related to the Realistic Holland personality type; (6) socioeconomic status is positively related to the Realistic Holland personality types; (7) scientific interest is positively related to the Investigative Holland personality type; (8) warmth of maternal relationship is positively related to the Artistic Holland personality type; and (9) warmth of paternal relationship is positivel related to the Realistic Holland personality type.

Several ancillary questions also arise when considering

these psychological constructs simultaneously. For instance, the relationships between life history experiences and sex-roles and self-esteem seems to warrant further consideration. As noted in the literature review, many researchers have shown that demographic and/or personal variables are related to sex-role orientation and to self-esteem. Therefore, it seems appropriate to examine several of these variables simultaneously. Moreover, since socialization processes seem to be changing, it seems prudent to reexamine these factors in relation to a cohort of today's college women. Here, it was hypothesized that biodata factors would be predictive of sex-roles. Second, biodata and sex-roles were hypothesized to account for a significant amount of the variance in self-esteem. Finally, biographical information alone was hypothesized to account for a significant amount of the variance in self-esteem.

The literature also indicates that the relationship between sex-roles and self-esteem is unclear. Therefore, I also examined the relationship between sex-roles and self-esteem (psychological adjustment) in order to expand the empirical base for this complicated topic. Moreover, these relationships were studied in terms of the sex-role models that were previously discussed. Thus, the present study focused not only on the relationship of these three psychological constructs to vocational behavior, but also examined the relationships among these constructs.

METHOD

Subjects

Subjects for the present study were female students enrolled in undergraduate psychology courses at Iowa State University. The students participated in exchange for credit towards their course grades. Two hundred ninety-six females took part in the study.

The rationale for utilizing female subjects exclusively was substantive. As stated earlier, one reason for the focus on females was to examine the applicability of Holland's vocational theory to this group. Secondly, there have been many critical changes in women's vocational behavior, life history experiences and sex-role orientations. Therefore, it was deemed important to examine females.

Instruments

Strong-Campbell Interest Inventory (SCII) (Hansen & Campbell, 1985, see Appendix A)

The first instrument selected for the present investigation was the SCII, the current edition of the Strong Vocational Interest Blank (SVIB). The SCII is a carefully constructed questionnaire that contains 325 items that relate to a respondent's interests in a wide range of occupations,

occupational activities, hobbies, leisure activities, school subjects and types of people. The SCII is self-administered and takes about 30 minutes to complete. The respondent is asked to indicate "Like," "Indifferent," or "Dislike" in relation to each item. The responses are then computer analyzed to obtain scores on 264 scales.

The SCII provides five major types of information. First, scores on six General Occupational Themes (GOTs) are provided. These scores reflect the respondents' overall occupational orientation and are the scores of primary importance in the present study. Second, scores on 23 Basic Interest Scales, which reveal the consistency of interests or lack thereof in 23 specific areas (e.g., art, science, public speaking), are provided. Third, scores on 207 Occupational Scales, which indicate the degree of similarity between one's interests and the interests characteristic of men and women in a wide range of occupations, are reported. Fourth, information on two special scales, which measure introversion/extroversion and degree of comfort in academic settings, is provided. Finally, scores are provided for 26 Administrative Indexes that are used to identify invalid or unusual profiles.

For the purposes of this investigation the GOTs and the Administrative Indexes are the scores that were used. Campbell and Holland (1972) created six scales (GOTs), which represented Holland's six modal personality types, for the

SVIB. These scales were found to conform well with Holland's theory. This research represented an attempt to integrate Strong's stark, empirical approach with Holland's theoretical approach to studying vocational behavior. The new GOTs, or Holland Scales, measure the six personality and environmental types identified by Holland. The six types (RIASEC) are each represented by 20 items selected to fit Holland's descriptions.

The scores on the six GOTs were standardized using a sample of 600 persons, resulting in a T-score with a mean of 50 and a standard deviation of 10 (Hansen & Campbell, 1985). Half of this sample was male and half was female, and they represented men and women from vocational, and professional occupations in all six of the Holland types. However, because men and women have different distributions on these six scales, interpretation is usually pursued separately for the two genders. Consequently, printed statements based on separate male and female norms are also provided. Seven descriptive statements ranging from "Very High" to "Very Low" are used. Thus, a score of 60 on the Realistic scale may be described as average for a male and high for a female. The percentiles associated with each of these interpretive comments are provided in Table 3.

In regards to the reliability of the GOTs, several estimates were reported by Hansen and Campbell (1985). Test-retest reliabilities over a two-week time period ranged from

Table 3. Percentiles associated with interpretive comments on the SCII GOTs (from Hansen & Campbell, 1985)

Interpretive Comment	Percentile
Very High	94th and above
High	85th to 93rd
Moderately High	70th to 84th
Average	31st to 69th
Moderately Low	16th to 30th
Low	7th to 15th
Very Low	6th and below

.85 to .91; over a 30-day time period they ranged from .84 to .91; and over a three-year period the range was .78 to .87. Thus, ample evidence of the stability of the GOT scales was provided. Internal consistency reliabilities were also computed for the six GOTs. For a large sample of females, coefficient alphas ranged from .90 to .93, indicating a high degree of internal consistency associated with these scales.

The construct validity of the GOTs has also been demonstrated several times. For example, Hansen and Campbell (1985) reported high correlations between the same-named GOT and VPI scale (the median r was .77). This indicated that the two inventories measured similar interest traits. For a more detailed account of the validity studies, see Hansen and Campbell (1985).

In short, according to Johnson (1976):

> Campbell and his co-workers not only have merged effectively the male and female forms [of the SVIB], but have also improved substantially the interest inventory

> by eliminating undesirable items from the item pool, by adding a large number of new Occupational Scales, and by providing a theoretical structure for the empirical scales. (p. 45)

The SCII appears to be a reliable and valid assessment device. Because of its brevity, the range of information it provides, and the fact that it is self-administered, the SCII lends itself well to the purposes of the present investigation.

In addition to the GOTs, two of the Administrative Indexes were used in the present study to flag problem answer sheets. The first of these indexes, Total Responses (TR), represents the number of item responses recorded by the computer. If the TR drops below 305 (out of 325 items) then questions about the validity of the scores arise. Second, the Infrequent Response (IR) index was used. This index was used to identify answer sheets that may have been marked incorrectly. The item weights were assigned so that respondents selecting several uncommon choices received a low score. If an individual marked more infrequent responses than the average person, then his/her score would be negative. Therefore, a negative number on the IR index indicated that a response problem was likely somewhere.

Biographical Questionnaire (BQ) (Owens, 1971, see Appendix B)

Owens (1968) proposed that historic or antecedent information be obtained through the use of a scored biographical data form designed to cover dimensions of a

subject's prior experiences and demographic characteristics. Therefore, in 1976 he developed a systematic method for collecting and using life history information--the Biographical Questionnaire (BQ) (Owens, 1976). In its initial stage the BQ was a 659 item instrument based on 2,000 item specifications, which covered a broad range of prior experiences. The final version was reduced to 118 multiple choice items through the application of factor analytic techniques. This self-report inventory takes approximately 40 minutes to complete and consists of items that cover a broad spectrum of life history experiences such as family life, school related activities, religious activities, sports activities, and familial socioeconomic circumstances (Owens & Schoenfeldt, 1979).

Independent factor analyses of the items by gender resulted in the identification of 15 interpretable factors for females and 13 for males (Owens, 1971). A visual inspection of the item loadings suggests that four factors are virtually identical, that six others are quite similar, and that only five female and three male factors are characteristic of a single gender.

Eberhardt and Muchinsky (1982a) investigated the factor structure of the BQ using a large sample of college students. In an investigation of the factor stability, they discovered that about half (seven) of the female factors had remained stable from 1971 to 1982. The reason for the partial support

for female factors seemed to involve the changes in roles and perceptions of women that have occurred in recent years. Perhaps these changing roles and perceptions have also led to changing life history experiences for women. Changes in life history experiences may be attributable to changing socialization in schools and family upbringing, and the changing aspirations of young women as early as high school. Additional support for this explanation comes from the greater male-female factor congruence found in 1982 as compared to 1971. This indicates that the early life experiences of females and males are becoming more homogeneous.

On the basis of Eberhardt and Muchinsky's (1982a) findings, the subjects' item responses in the present study were summed to form factor scores in accordance with the factor structure they identified. Thus, for each female 15 BQ factor scores were obtained. Table 4 presents the title, description and reliability associated with each biodata factor.

Bem Sex-Role Inventory (BSRI) (Bem, 1981, see Appendix C)

The BSRI was developed in order to implement empirical research on psychological androgyny in that it was designed to avoid automatically building an inverse relationship between masculinity and femininity, as most previous inventories had done. The short form of the BSRI is a self-administered survey that contains 30 personality characteristics and takes about 15 minutes to complete. Ten of the personality

Table 4. Female biodata factors with representative items

Factor name		Description	Reliability[a]
I.	Social Leadership & Popularity with Males	Participated in school politics, held leadership positions, went on more dates, and started dating regularly and going steady earlier.	.86
II.	Academic Achievement	Earned high grades with high class standing, competitive in academic situations and expected success.	.89
III.	Freedom from Parental Control	Parents less strict and critical, allowed more freedom or independence, less punitive.	.85
IV.	Socioeconomic Status	High parental level of education, high parental occupation level, above average family income, parents belong to many clubs.	.82
V.	Athletic Participation	Rated past performance in physical activities high, very active in athletic activities, engaged in more individual and team sports, frequently read sports magazines.	.88
VI.	Religious Activity	Strong religious beliefs, went to church often, active in church and religious activities, religion important to family.	.83
VII.	Negative Social Adjustment	Frequent misunderstandings with parents, felt downcast and dejected, felt like "taking things out" on parents and friends, worked to be more socially acceptable and powerful	.79
VIII.	Warmth of Maternal Relationship	Very close to mother, mother gave emotional support and interest, intimate matters discussed with mother.	.79

[a]Reliability estimates obtained from Eberhardt and Muchinsky (1982a).

Table 4. (Continued)

Factor name		Description	Reliability[a]
IX.	Sibling Friction	Felt more friction and feelings of competition toward siblings and had more frequent arguments with them.	.76
X.	Warmth of Paternal Relationship	Very close to father, father gave emotional support, interest and attention, both parents gave praise, affection and attention.	.84
XI.	School and Cultural Activities	Active in high school subject matter clubs, worked on school newspaper or annual, held leadership positions, watched educational and cultural television programs.	.71
XII.	Scientific Interest	Enjoyed science courses, worked often with scientific equipment, excelled in physical and biological sciences.	.87
XIII.	Independence/ Dominance	Enjoyed discussion courses, participated in many small group activities, questioned teachers on course matter, regarded as radical or unconventional.	.70
XIV.	Positive Academic Attitude	Teachers aroused academic interest and allowed class participation, liked school and teachers, spent more hours per week doing homework.	.77
XV.	Position in Family	More younger brothers and sisters closer to their age.	.80

characteristics are stereotypically feminine (e.g., affectionate, understanding, sensitive) and ten are stereotypically masculine (e.g., ambitious, assertive, self-reliant). The final ten characteristics serve as filler items (e.g., happy, truthful, conceited). The BSRI is completed by

the respondent indicating, on a seven-point scale, how well each of the 30 characteristics describes herself or himself. The scale ranges from one, "Never or almost never true," to seven, "Always or almost always true."

The BSRI yields an average of the ratings for both the Femininity and Masculinity scales. These scales were used for analyses in the present study. However, information obtained from these two scales can also be used to classify the subjects according to their sex-role orientation. Originally, the classification was based on a student's t-ratio for the difference between the total points assigned to the Femininity and Masculinity scales. Thus, if a person's Femininity score was significantly higher than her masculinity score, she was classified as Feminine; and vice versa. On the other hand, if an individual's Masculinity and Femininity scores were approximately equal that person was classified as Androgynous.

However, as Spence et al. (1975) and Strahan (1975) pointed out, this classification system served to obscure a potentially important distinction between individuals who score high on both the Femininity and Masculinity scales and those who score low on both. Accordingly, the median split method is recommended to classify subjects (Bem, 1981). With this method, subjects are divided at the median on both the Femininity and Masculinity scales, which results in a fourfold classification: Feminine (high Femininity-low Masculinity); Masculine (high Masculinity-low Femininity); Androgynous (high

Masculinity-high Femininity); and Undifferentiated (low Masculinity-low Femininity).

Bem (1981) provided evidence of both the reliability and validity of the BSRI. Internal consistency was estimated for females in two large college sample. The results yielded coefficient alphas that ranged from .75 to .78 for Femininity, .86 to .87 for Masculinity, and .78 to .82 for the Femininity-minus-Masculinity Difference score. In addition, test-retest reliability was calculated with a four-week time interval between test administrations. For females, these reliabilities ranged from .82 to .94.

Several studies have also revealed that the BSRI is a valid instrument. For example, Bledsoe (1983) found that of the nonfiller BSRI items, the majority performed as hypothesized, suggesting sound construct validity for the total scales. However, several adjectives were not perceived as associated with masculine or feminine roles, suggesting that perceptions of traditional sex-roles are changing. Additional support for the validity of the BSRI was provided by a series of studies on instrumental and expressive behavior. In these studies, only Androgynous persons consistently displayed high levels of behavior in both domains (Bem, 1975).

In sum, the BSRI appears to be a valid and reliable assessment device. Because the BSRI is self-administered, brief and yields a range of information, it lends itself well

to the purposes of the present study.

Self-Esteem Inventory (SEI) (Coopersmith, 1987, see Appendix D)

The Coopersmith SEI is a self-report questionnaire intended to measure the evaluation a person makes and generally maintains with regard to herself. The SEI presents the respondent with 25 generally favorable or generally unfavorable statements about the self, which they indicate as "like me" or "unlike me." The SEI is self-administered and takes 10 minutes or less to complete.

The SEI is one of the best-known and most widely used of the various measures of self-esteem. Therefore, there have been many studies conducted on the reliability and validity of this instrument. Coopersmith (1987) reported that the internal consistency reliability of the SEI ranged from .78 to .85. Moreover, Bedeian, Geagud, and Zmud (1977) computed test-retest reliabilities for 103 college students and discovered a coefficient alpha of .82 for females.

In terms of validity, investigators have found evidence of construct, concurrent and predictive validity. For example, several studies have revealed convergent validity between the SEI and other measures of self-esteem (e.g., Crandall, 1973; Johnson, Redfield, Miller & Simpson, 1983). Further information on the validity of the SEI may be obtained from Coopersmith (1987).

According to Peterson and Austin (1985) the SEI has much

to recommend to as a measure of self-esteem. It is brief and easily scored. It is reliable and stable, and there is an impressive amount of information bearing on its construct validity. Therefore, many investigators recommend the SEI for use in research (e.g., Peterson & Austin, 1985; Sewell, 1985).

In sum, all four of these measurement devices appear to have enough technical support to warrant their use in the present study. Moreover, the ease of administration and wide range of information tapped make these instruments appropriate. Finally, all four of these measures are well known and widely used. This is important because it enhances the chances for study replication in the future.

Procedure

Data were collected in four mass-testing sessions with approximately 75 subjects per session. After the subjects were seated in the data collection room, each subject was given a packet that contained a modified informed consent form (see Appendix E) and the four questionnaires: the SCII, the BQ, the BSRI, and the SEI. The subjects were then instructed to read the cover-sheet and the directions for each questionnaire and were asked if they had any questions. The subjects then completed the instruments by marking their responses on the appropriate answer sheet. This took most respondents between one and one and one-half hours.

The order of presentation of the four surveys was counterbalanced to control for order effects and the potential effects of boredom, fatigue, and response bias due to sensitization to the purpose of the research. In other words, 74 of the subjects completed the SCII first, 74 completed the BQ first, 74 completed the BSRI first, and the remaining 74 students completed the SEI first

Data Analyses

The initial data analysis consisted of descriptive statistics. The means and standard deviations were calculated for the 15 BQ scales, the BSRI Masculinity and Femininity scale scores, and the SEI score.

The T-scores for the SCII GOTs were used because they possessed a larger range and, thus, greater discriminating power than the interpretive comments. The interpretive comments were, however, also used for the SCII GOTs, because of the benefits associated with using female norms. As stated earlier, seven interpretive comments ranging from "Very High" to "Very Low" were used (see Table 3 for the percentiles associated with each of these interpretive comments). For the purposes of this study, these seven statements were assigned a numerical value ranging from one ("Very Low") to seven ("Very High").

The subjects were then classified into six separate

groups in the following manner: (1) subjects whose highest T-score or interpretive score was on the "R" scale were identified as belonging to the Realistic group; (2) those individuals with a highest score on the "I" scale were classified as Investigative; (3) those with a highest score on the "A" scale were classified as Artistic; (4) subjects whose highest score was on the "S" scale were grouped as Social; (5) subjects with their highest score on the "E" scale were deemed Enterprising; and (6) those individuals with their highest score on the "C" scale were classified as Conventional. A seventh group included all individuals with two or more high-point codes.

In addition, subjects were grouped according to their two-point Holland codes. For the present study, the order of the two high-point codes was not taken into account. This procedure reduced the total number of groups from thirty to fifteen. Moreover, this procedure avoided the problem of ties in the first two codes. A sixteenth group was also included. This group included individuals whose second and third Holland codes were tied.

The frequencies of high-point Holland codes and two-point Holland codes were calculated. After the descriptive statistics were calculated, a set of primary analyses, which focussed on the Holland codes as dependent variables, was conducted. The final set of analyses examined the relationships among the BQ, BSRI and SEI scale scores.

Primary analyses

The analyses described in this section were conducted to better understand the relationship between life-history experiences, sex-roles, self-esteem and vocational type. That is, vocational type was specified as the dependent variable and life-history experiences, sex-roles and self-esteem served as independent variables. The first statistical technique utilized was multiple discriminant analysis. This technique was employed to examine the differences between two or more groups with respect to several variables simultaneously.

In the first multiple discriminant analysis, the subjects were separated into six groups based on their high-point Holland code (R, I, A, S, E or C). Due to the large number of ties associated with the interpretive high-point Holland codes, the T-scores were used to separate subjects into the RIASEC categories. The discriminating variables included the 15 BQ scores, the Masculinity and Femininity scale scores from the BSRI, and the SEI score. Thus, a total of six groups and eighteen discriminating variables were used in the full model.

The second multiple discriminant analysis also utilized a full model, or all eighteen discriminating variables. However, this analysis specified the two-point Holland codes as the group variable. Again, due to the large number of ties associated with the interpretive Holland codes, the T-scores were used to separate subjects into 15 groups, as described above. The maximum number of unique functions that could be

derived equals the number of groups minus one. Therefore, no more than five significant discriminant functions could be obtained in the first discriminant analysis, and no more than fourteen in the second.

Multiple discriminant analyses were conducted for several reduced models. First, the 15 BQ scores were used as discriminating variables in two discriminant analyses. One analysis involved the six high-point Holland codes, and another analysis involved the 15 two-point codes used for group identification. Second, the Masculinity and Femininity scale scores from the BSRI were used as discriminating variables in two discriminant analyses, one with the high-point codes and the other with the two-point codes. Finally, the SEI scale score was used as the discriminating variable in two discriminant analyses involving the high-point and two-point codes as group identifiers.

Classifying subjects according to a high-point or two-point Holland code raised several issues: Are subjects with a score of 60 on their high-point code the same as those with a 40? Is an "IR" truly comparable to a "RI"? Is there a difference between a subjects with a 65 on their highest code and a 40 on their second code and subjects with 65s on both codes? Such questions make evident the fact that the classification system outlined above did not utilize all of the information available from the six SCII GOT scales. Therefore, another primary analysis involved canonical

correlations. The canonical correlation analysis used the six GOT scale scores derived from the interpretive comments as the dependent variables and the 15 BQ scale scores, the Masculinity and Femininity scale scores, and the SEI score as the independent variables.

Many other relationships among the three psychological constructs and Holland's personality types were explored. Specifically, nine additional hypotheses were examined: (1) self-esteem is inversely related to the Artistic (predominantly female) Holland personality type; (2) self-esteem is positively related to the Realistic (predominantly male) Holland personality type; (3) masculinity is positively related to the Realistic Holland personality types; (4) femininity is positively related to the Artistic Holland personality types; (5) freedom from parental control is positively related to the Realistic Holland personality type; (6) socioeconomic status is positively related to the Realistic Holland personality types; (7) scientific interest is positively related to the Investigative Holland personality type; (8) warmth of maternal relationship is positively related to the Artistic Holland personality type; and (9) warmth of paternal relationship is positively related to the Realistic Holland personality type. These relationships were examined via correlation coefficients. Because the interrelationships of particular variables may be of interest to some readers, Pearson correlation coefficients were derived

for the relationships between the Holland codes and the 15 BQ factors, Masculinity, Femininity, and the SEI score.

Secondary analyses

The analyses described in this section were conducted to better understand the relationship between and among the life-history, sex-role and self-esteem variables. Initially, Pearson correlation coefficients were derived for all relationships among the biodata factors, sex-role variables and the self-esteem scale score.

In addition, several ordinary least squares multiple regressions were performed. First, the masculinity and femininity variables were regressed on the 15 BQ scales. Second, self-esteem (as measured by the SEI) was regressed on the 15 BQ scale scores, as well as on the 15 BQ scores plus the BSRI Masculinity and Femininity scales.

The final secondary analysis was designed to test the androgynous, congruence, masculinity, and interactive androgyny models of self-esteem. These models were examined using ordinary least squares multiple regression analysis. Self-esteem was regressed on Masculinity, Femininity, and the interaction between Masculinity and Femininity. If all three terms contributed significantly to the regression equation, the interactive androgyny model would be supported. If both Masculinity and Femininity made a statistically significant contribution to the regression equation, but the interaction term did not, then the androgynous model would have been

supported. If only Masculinity added significantly to the model, but femininity weighs negatively or not at all, then the masculinity model would be supported. And, if Femininity was the only variable found to be statistically significant to the equation, then the congruence model would be supported, because all of the subjects were female.

RESULTS

Descriptive Statistics

Table 5 presents the means, standard deviations and ranges for the biodata, sex-role and self-esteem variables. It should be noted that the biodata factors are inversely coded. In other words, a low score on a biodata factor represents a high association with the factor. Thus, for example, the minimum score of 29 on the Social Leadership and Popularity factor represents a subject who participated in more school politics, held more leadership positions, and went on more dates than any other subjects.

The Holland code frequencies are presented in Tables 6 and 7. Both the interpretive and T-score GOT frequencies are presented in these tables. As can be seen in Table 6, almost half (45.4%) of the subjects were classified as ties when the interpretive comments were used. However, when T-scores were used to classify subjects on the GOTs, the number of ties was reduced dramatically to 7.2% of the sample. Similarly, when subjects were classified by two-point Holland codes, 51% of the subjects were tied on the interpretive comments, versus a mere 7.2% when the T-scores were utilized (see Table 7). Due to the large number of ties associated with the interpretive comments, only the T-scores were used to classify subjects for further analyses.

Table 5. Descriptive statistics for biodata, sex-role and self-esteem variables (n=296)

Variable	Mean	SD	Minimum Value	Maximum Value
Social Leadership & Popularity	50.99	8.55	29.00	78.00
Academic Achievement	28.03	8.50	12.00	55.00
Freedom from Parental Control	25.60	6.70	12.00	49.00
SES	26.51	6.58	10.00	44.00
Athletic Part.	24.20	7.54	9.00	45.00
Religious Activity	11.66	3.82	4.00	20.00
Negative Social Adjustment	47.17	4.40	32.00	61.00
Warmth of Maternal Relationship	31.34	5.80	19.00	48.00
Sibling Friction	8.74	2.72	3.00	15.00
Warmth of Paternal Relationship	25.29	6.27	9.00	42.00
School & Cultural Activities	44.35	5.45	25.00	53.00
Scientific Interest	31.62	7.88	15.00	53.00
Independence/ Dominance	21.52	4.00	10.00	33.00
Positive Academic Attitude	22.57	5.06	11.00	38.00
Family Position	7.40	2.41	2.00	10.00
Femininity	5.74	.80	3.10	7.00
Masculinity	5.05	.84	2.90	7.00
Self-Esteem	74.60	18.68	12.00	100.00

Table 6. Frequency distribution for high-point Holland codes (n=293)

	Interpretive High-Point Code		T-Score High-Point Code	
	Frequency	%	Frequency	%
Ties	133	45.4	21	7.2
Realistic	4	1.4	1	.3
Investigative	17	5.8	17	5.8
Artistic	15	5.1	46	15.7
Social	49	16.7	87	29.7
Enterprising	43	14.7	55	18.8
Conventional	32	10.9	66	22.5

Tables 6 and 7 also reveal a lack of Realistic subjects in this sample. Only 1 of the 293 subjects was classified as Realistic using T-scores (see Table 6). Moreover, only six of the subjects were given a Realistic two-point classification using T-scores (see Table 7). Because of the infrequency of the Realistic classification, it was dropped for purposes of discriminant analysis.

As can be seen in Table 6, subjects without high-point ties were most often classified as Social, followed by Conventional, Enterprising and Artistic. The most common two-point codes were Enterprising/Conventional, followed by Artistic/Social, Social/Enterprising and Social/Conventional (see Table 7).

Table 7. Frequency distribution for two-point Holland codes (n=293)

	Interpretive Two-Point Code		T-Score Two-Point Code	
	Frequency	%	Frequency	%
Ties	151	51.5	21	7.2
Realistic/Investigative	1	.3	1	.3
Realistic/Artistic	0	00.0	2	.7
Realistic/Social	4	1.4	0	00.0
Realistic/Enterprising	0	00.0	1	.3
Realistic/Conventional	3	1.0	2	.7
Investigative/Artistic	6	2.0	11	3.8
Investigative/Social	7	2.4	11	3.8
Investigative/Enterprising	2	.7	3	1.0
Investigative/Conventional	4	1.4	9	3.1
Artistic/Social	18	6.1	50	17.1
Artistic/Enterprising	8	2.7	26	8.9
Artistic/Conventional	4	1.4	12	4.1
Social/Enterprising	29	9.9	44	15.0
Social/Conventional	17	5.8	40	13.7
Enterprising/Conventional	39	13.3	60	20.5

Primary Analyses

Multiple discriminant analyses

Full models The results from the multiple discriminant analysis for the full model of the high-point Holland codes are presented in Table 8. For this model, the high-point Holland T-score classifications which had frequencies of ten or more were utilized as the group variables, resulting in five groups (IASEC). The discriminating variables included the 15 biodata factors, the BSRI Masculinity and Femininity scale scores, and the SEI score. Table 8 shows the eigenvalue, percentage of variance, Wilk's Lambda, canonical correlation, chi-square test, and significance level for each discriminant function. As can be seen, two discriminant functions were statistically significant, and collectively they accounted for 77.19% of the variance explainable by the discriminating variables.

Table 8. Canonical discriminant functions for full model of high-point Holland codes (n=271)

Function	Eigenvalue	% Var.	Wilk's Lambda	Canonical Correlation	X^2
I	.311	48.11	.557	.487	151.10**
II	.188	29.08	.731	.398	81.18*
III	.083	12.91	.868	.277	36.71
IV	.064	9.90	.940	.245	16.02

*$p < .01$. **$p < .001$.

Table 9. Standardized canonical discriminant function coefficients for statistically significant discriminant functions for full model of high-point Holland codes (n=271)

Variables	Function I	Function II
Social Leadership & Popularity	-.215	.131
Academic Achievement	.011	-.009
Freedom from Parental Control	-.014	.049
Socioeconomic Status	.374	-.759
Athletic Participation	-.537	.080
Religious Activity	-.273	-.008
Negative Social Adjustment	-.024	-.147
Warmth of Maternal Relationship	-.104	.301
Sibling Friction	-.064	.135
Warmth of Paternal Relationship	-.055	.289
School & Cultural Activities	.348	-.060
Scientific Interest	.558	.666
Independence/Dominance	-.040	.134
Positive Academic Attitude	-.155	-.114
Position in Family	-.100	.255
Self-Esteem	.310	.232
Masculinity	-.110	.199
Femininity	.217	-.067

Table 9 gives the standardized canonical discriminant function coefficients for the two statistically significant discriminant functions. The interpretation of these coefficients is analogous to betas in multiple regression analysis. Accordingly, their relative magnitudes represent the relative contribution, or importance, of the discriminating variables to the discrimination between the groups. Thus, for the first function Athletic Participation (-.537) and Scientific Interest (.558) appear to contribute the most to group discrimination, and Socioeconomic Status

Table 10. Significant pooled within-groups correlations between discriminating variables and statistically significant canonical discriminant functions for full model of high-point Holland codes (n=271)

Variables	Function I	Function II
Social Leadership & Popularity	-.348	
Academic Achievement		.402
Socioeconomic Status		-.500
Athletic Participation	-.445	
Scientific Interest	.409	.606
Position in Family		.314
Femininity	.314	

(-.759) and Scientific Interest (.666) seem to do the same for the second function (see Table 9). Because the standardized coefficients may lack stability due to multicollinearity, however, many psychometricians recommend that structure coefficients be used for the interpretation of the discriminant functions (e.g., Klecka, 1980; Pedhazur, 1982).

The structure coefficients, alternatively referred to as the pooled within-groups correlations between the discriminating functions and the discriminating variables, are presented for the two statistically significant functions in Table 10. Following the rule of thumb suggested by Pedhazur (1982), only those structure coefficients greater than or equal to .30 are treated as meaningful. Only such meaningful structure coefficients are included in Table 10. A total of seven discriminating variables comprised the two statistically significant discriminant functions.

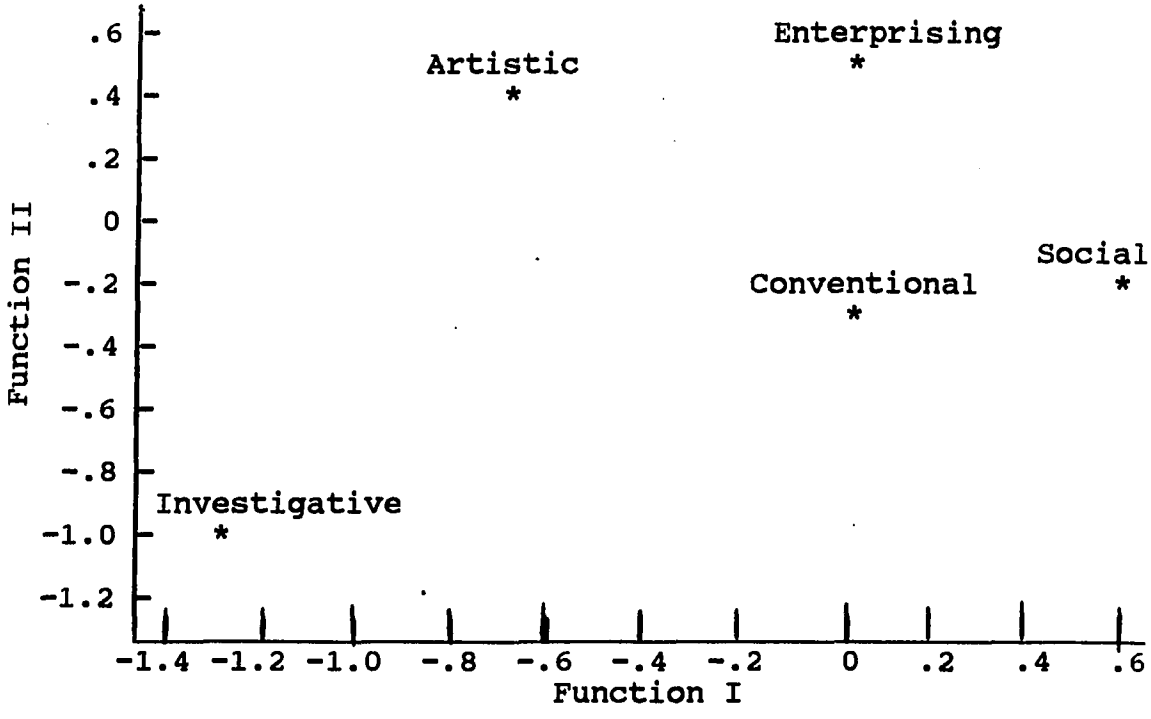

Figure 2. High-point Holland code centroids plotted in two-dimensional space defined by the first and second discriminant dimensions for full model

The group centroids resulting from the discriminant analyses were computed for each statistically significant function. The group centroids reflect the mean for each vocational group on each statistically significant discriminant function. Figure 2 depicts the group centroids on functions I and II.

The results from the multiple discriminant analysis for the full model of the two-point Holland codes are presented in Table 11. As with the high-point Holland codes, the two-point Holland codes were calculated using T-scores, and classifications which had frequencies of ten or more were

Table 11. Canonical discriminant functions for full model of two-point Holland codes (n=254)

Function	Eigenvalue	% Var.	Wilk's Lambda	Canonical Correlation	X^2
I	.312	31.14	.401	.488	219.57**
II	.236	23.54	.526	.437	154.32**
III	.157	15.65	.650	.368	103.44*
IV	.110	11.01	.752	.315	68.44
V	.100	9.95	.835	.301	43.28
VI	.061	6.09	.918	.240	20.46
VII	.026	2.62	.974	.160	6.22

*$p < .05$. **$p < .001$.

utilized as the group variables, resulting in eight groups (IA, IS, AS, AE, AC, SE, SC, and EC). Similar to the full model for the high-point codes, the discriminating variables included the 15 biodata factors, the BSRI Masculinity and Femininity scale scores, and the SEI score. Table 11 shows the eigenvalue, percentage of variance, Wilk's Lambda, canonical correlation, chi-square test, and significance level for each discriminant function. As can be seen, three discriminant functions were statistically significant, and collectively they accounted for 70.33% of the variance explainable by the discriminating variables.

The standardized canonical discriminant function coefficients for the three statistically significant functions for the above model are presented in Table 12. For the first function Scientific Interest (.945) appears to contribute the most to group discrimination, while Socioeconomic Status

Table 12. Standardized canonical discriminant function coefficients for statistically significant discriminant functions for full model of two-point Holland codes (n=254)

Variables	Function I	Function II	Function III
Social Leadership & Popularity	-.441	.153	-.537
Academic Achievement	-.384	.076	.825
Freedom from Parental Control	-.325	.020	.038
Socioeconomic Status	.169	-.754	-.214
Athletic Participation	-.165	.397	.157
Religious Activity	-.218	.019	.327
Negative Social Adjustment	.077	-.046	-.317
Warmth of Maternal Relationship	.396	.059	-.131
Sibling Friction	-.097	-.156	.448
Warmth of Paternal Relationship	-.288	.305	.338
School & Cultural Activities	-.038	-.469	.344
Scientific Interest	.945	.147	-.257
Independence/Dominance	.205	.490	.179
Positive Academic Attitude	.025	.013	-.258
Position in Family	.266	.332	-.560
Self-Esteem	.084	.121	-.061
Masculinity	.094	.318	.323
Femininity	-.044	-.152	-.110

Table 13. Significant pooled within-groups correlations between discriminating variables and statistically significant canonical discriminant functions for full model of two-point Holland codes (n=254)

Variables	Function I	Function II	Function III
Social Leadership & Popularity	-.389		-.319
Socioeconomic Status		-.492	
Athletic Participation		.339	
Sibling Friction			.363
Scientific Interest	.635		
Positive Academic Attitude		.340	
Position in Family	.360		-.300

(-.754) and Academic Achievement (.825) are most important for the second and third functions respectively.

Table 13 shows the significant, or meaningful, pooled within-groups correlations (structure coefficients) between the statistically significant discriminant functions and the discriminating variables for the two-point Holland code full model. As can be seen, a total of seven biodata factors comprised the three statistically significant discriminant functions.

The group centroids resulting from the discriminant analyses were computed for each statistically significant function. The group centroids reflect the mean for each group on each statistically significant discriminant function. Figure 3 depicts the group centroids on functions one and two,

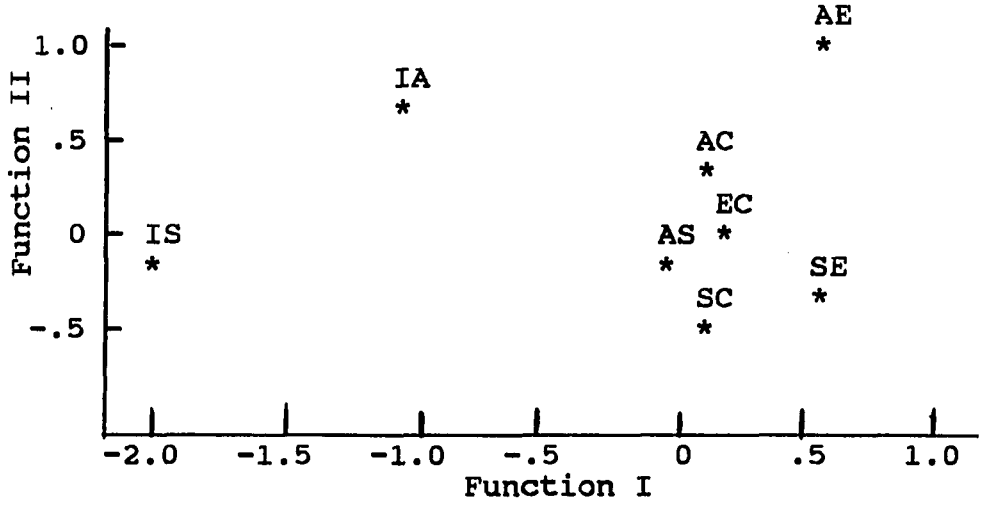

Figure 3. Two-point Holland code centroids plotted in two-dimensional space defined by the first and second discriminant dimensions for full model

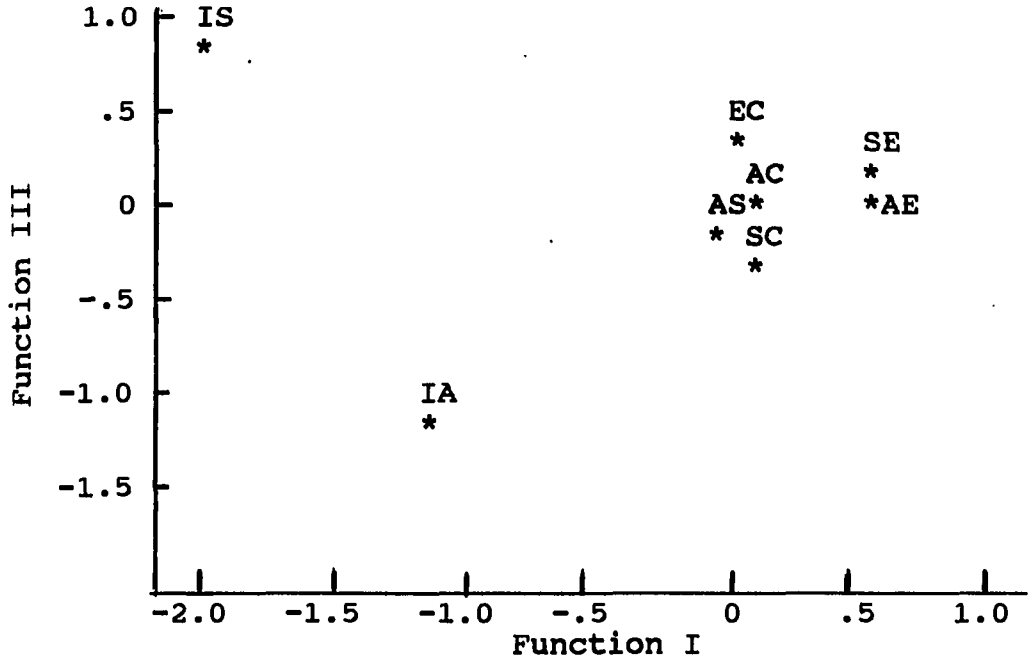

Figure 4. Two-point Holland code centroids plotted in two-dimensional space defined by the first and third discriminant dimensions for full model

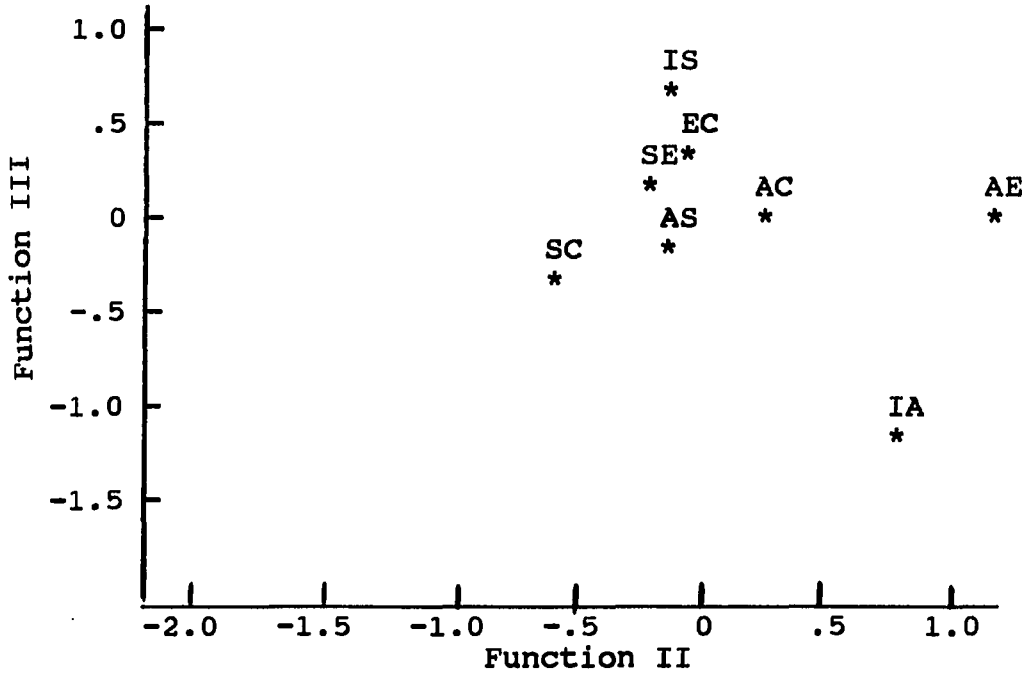

Figure 5. Two-point Holland code centroids plotted in two-dimensional space defined by the second and third discriminant dimensions for full model

Holland's description of the Enterprising personality type as ambitious, and the Investigative type as analytical and intellectual.

Reduced models The results from the multiple discriminant analysis for the reduced model of the high-point Holland codes, utilizing only the 15 biodata factors as the discriminating variables, are presented in Tables 14, 15 and 16. Again, the high-point Holland codes were calculated using T-scores, and classifications which had frequencies of ten or more were used as the group variables, resulting in five groups (IASEC). Table 14 shows the eigenvalue, percentage of variance, Wilk's Lambda, canonical correlation, chi-square test, and significance level for each discriminant function. As can be seen, two discriminant functions were statistically significant, and collectively they accounted for 83.64% of the variance explainable by the discriminating variables.

The standardized canonical discriminant function

Table 14. Canonical discriminant functions for reduced model of high-point Holland codes utilizing biodata factors (n=271)

Function	Eigenvalue	% Var.	Wilk's Lambda	Canonical Correlation	X^2
I	.283	51.72	.608	.470	129.54**
II	.175	31.92	.780	.386	64.68*
III	.051	9.30	.916	.220	22.79
IV	.039	7.07	.963	.193	9.87

*p < .05. **p < .001.

Table 15. Standardized canonical discriminant function coefficients for statistically significant discriminant functions for reduced model of high-point Holland codes utilizing biodata factors (n=271)

Variables	Function I	Function II
Social Leadership & Popularity	.344	.057
Academic Achievement	.002	-.001
Freedom from Parental Control	.068	.011
Socioeconomic Status	-.490	-.743
Athletic Participation	.495	.033
Religious Activity	.308	-.033
Negative Social Adjustment	-.012	-.090
Warmth of Maternal Relationship	.189	.215
Sibling Friction	.032	.121
Warmth of Paternal Relationship	.138	.273
School & Cultural Activities	-.369	-.022
Scientific Interest	-.548	.700
Independence/Dominance	-.043	.029
Positive Academic Attitude	.200	-.101
Position in Family	.136	.265

coefficients for the two statistically significant functions are presented in Table 15. For the first function Scientific Interest (-.548), Athletic Participation (.495) and Socioeconomic Status (-.490) appear to contribute the most to group discrimination, while Socioeconomic Status (-.743) and Scientific Interest (.700) are most important for the second function.

Table 16 shows the significant, or meaningful, pooled within-groups correlations (structure coefficients) between the statistically significant discriminant functions and the discriminating variables. As can be seen, a total of six

Table 16. Significant pooled within-groups correlations between discriminating variables and statistically significant canonical discriminant functions for reduced model of high-point Holland codes utilizing biodata factors (n=271)

Variables	Function I	Function II
Social Leadership & Popularity	.365	
Academic Achievement		.441
Socioeconomic Status		-.474
Athletic Participation	.465	
Scientific Interest	-.401	.678
Position in Family		.338

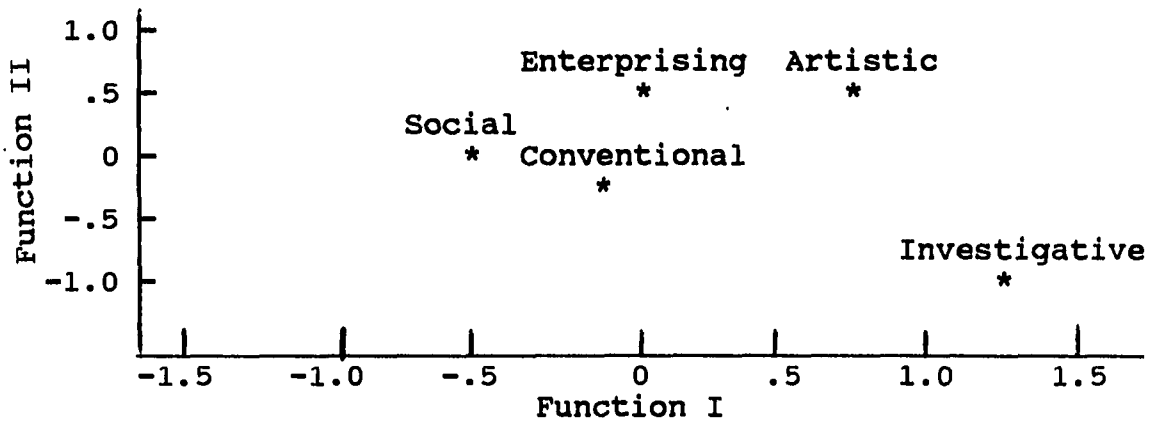

Figure 6. High-point Holland code centroids plotted in two-dimensional space defined by the first and second discriminant dimensions for reduced model utilizing biodata factors

biodata factors comprised the two statistically significant discriminant functions.

The group centroids resulting from the discriminant analyses were computed for each statistically significant discriminant function. Figure 6 depicts the group centroids on functions one and two.

Table 17. Canonical discriminant functions for reduced model of two-point Holland codes utilizing biodata factors (n=254)

Function	Eigenvalue	% Var.	Wilk's Lambda	Canonical Correlation	X^2
I	.310	33.74	.433	.486	202.32**
II	.217	23.66	.567	.422	137.21**
III	.147	16.03	.690	.358	89.78*
IV	.097	10.61	.791	.298	56.64
V	.086	9.36	.868	.281	34.22
VI	.047	5.11	.942	.212	14.32
VII	.014	1.49	.987	.116	3.27

*$p < .05$. **$p < .001$.

The results from the multiple discriminant analysis for the reduced model of the two-point Holland codes, utilizing only the 15 biodata factors as discriminating variables, are presented in Tables 17, 18 and 19. Again, the two-point Holland codes were calculated using T-scores, and classifications which had frequencies of ten or more were used as the group variables, resulting in eight groups (IA, IS, AS, AE, AC, SE, SC, and EC). Table 17 shows the eigenvalue, percentage of variance, Wilk's Lambda, canonical correlation, chi-square test, and significance level for each discriminant function. As can be seen, three discriminant functions were statistically significant, and collectively they accounted for 73.44% of the variance explainable by the discriminating variables.

The standardized canonical discriminant function coefficients for the three statistically significant functions

Table 18. Standardized canonical discriminant function coefficients for statistically significant discriminant functions for reduced model of two-point Holland codes utilizing biodata factors (n=254)

Variables	Function I	Function II	Function III
Social Leadership & Popularity	-.486	.101	-.516
Academic Achievement	-.396	-.073	.788
Freedom from Parental Control	-.342	-.061	.003
Socioeconomic Status	.226	-.747	-.391
Athletic Participation	-.191	.369	.213
Religious Activity	-.226	-.048	.342
Negative Social Adjustment	.111	.097	-.196
Warmth of Maternal Relationship	.370	.094	-.022
Sibling Friction	-.087	-.208	.521
Warmth of Paternal Relationship	-.313	.235	.322
School & Cultural Activities	.002	-.506	.292
Scientific Interest	.920	.243	-.152
Independence/Dominance	.129	.338	.096
Positive Academic Attitude	.044	.121	-.203
Position in Family	.244	.431	-.499

Table 19. Significant pooled within-groups correlations between discriminating variables and statistically significant canonical discriminant functions for reduced model of two-point Holland codes utilizing biodata factors (n=254)

Variables	Function I	Function II	Function III
Social Leadership & Popularity	-.403		
Academic Achievement			.377
Socioeconomic Status		-.479	
Athletic Participation		.321	
Religious Activity			.304
Sibling Friction			.475
Scientific Interest	.618		.302
Independence/Dominance		.305	
Positive Academic Attitude		.357	
Position in Family	.343	.341	

are presented in Table 18. For the first function Scientific Interest (.920) appears to contribute the most to group discrimination, while Socioeconomic Status (-.747) and Academic Achievement (.788) are most important for the second and third functions, respectively.

Table 19 shows the significant, or meaningful, pooled within-groups correlations (structure coefficients) between the statistically significant discriminant functions and the discriminating variables. As can be seen, a total of ten biodata factors comprised the three statistically significant discriminant functions.

The group centroids resulting from the statistical analyses were calculated for each of the statistically significant functions for the two-point reduced model, which used biodata factors only. The group centroids reflect the mean for each vocational classification on each significant

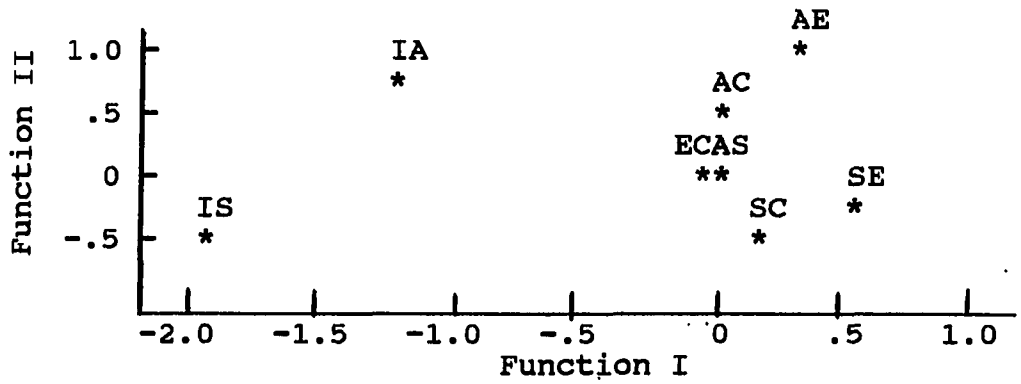

Figure 7. Two-point Holland code centroids plotted in two-dimensional space defined by the first and second discriminant dimensions for reduced model utilizing biodata factors

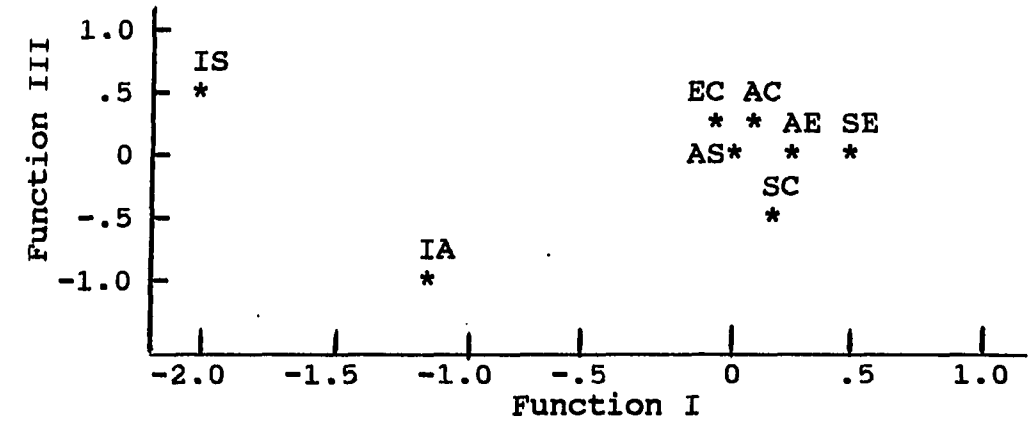

Figure 8. Two-point Holland code centroids plotted in two-dimensional space defined by the first and third discriminant dimensions for reduced model utilizing biodata factors

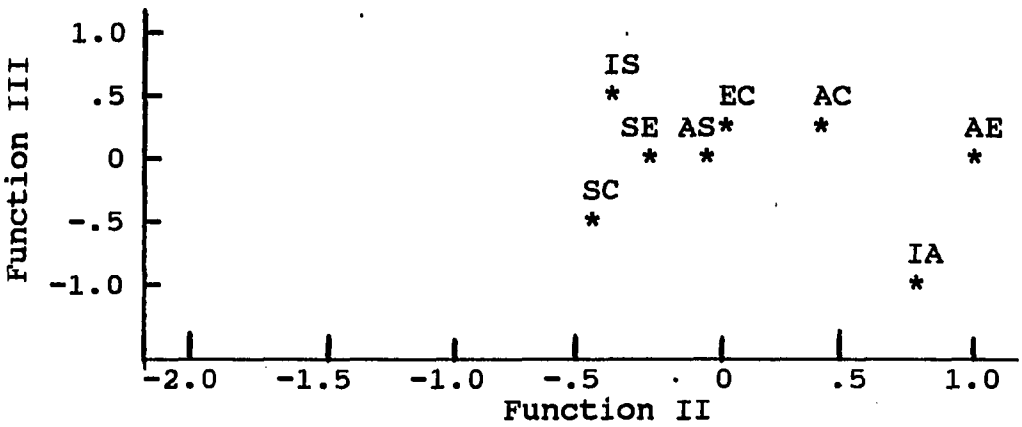

Figure 9. Two-point Holland code centroids plotted in two-dimensional space defined by the second and third discriminant dimensions for reduced model utilizing biodata factors

discriminant function. Figure 7 depicts the group centroids on functions one and two, Figure 8 presents the group centroids on functions one and three, and Figure 9 illustrates the group centroids on functions two and three.

The results from the multiple discriminant analysis for the reduced models of the high-point and two-point Holland

Table 20. Canonical discriminant functions for reduced models of Holland codes utilizing sex-role variables

Function	Eigenvalue	% Var.	Wilk's Lambda	Canonical Correlation	X^2
		High-Point Codes (n=271)			
I	.047	82.66	.945	.213	14.97*
II	.010	17.34	.990	.099	2.64
		Two-Point Codes (n=254)			
I	.053	67.81	.927	.224	18.94
II	.025	32.19	.976	.157	6.16

*$p < .10$.

codes, utilizing only the BSRI Masculinity and Femininity scales as discriminating variables, are presented in Tables 20 and 21. As previously described, both the high-point and two-point Holland codes were calculated using T-scores, and classifications which had frequencies of ten or more were used as the group variables. Table 20 shows the eigenvalue, percentage of variance, Wilk's Lambda, canonical correlation, chi-square test, and significance level for each discriminant function. As can be seen, one discriminant functions was statistically significant for the high-point Holland codes, and it accounted for 82.66% of the variance explainable by the discriminating variables. However, no function was significant for the two-point codes.

The standardized canonical discriminant function

Table 21. Discriminant statistics for reduced model of high-point Holland codes utilizing sex-role variables (n=271)

Variables	Standardized Coefficients	Significant Within-Groups Correlations
Masculinity	-.257	
Femininity	.990	.967

coefficients for the statistically significant function and the significant pooled within-groups correlations (structure coefficients) between the statistically significant discriminant function and the discriminating variables are presented in Table 21. Femininity (.990) appears to contribute the most to high-point group discrimination. In addition, Femininity was the only meaningful structure coefficient associated with the statistically significant function.

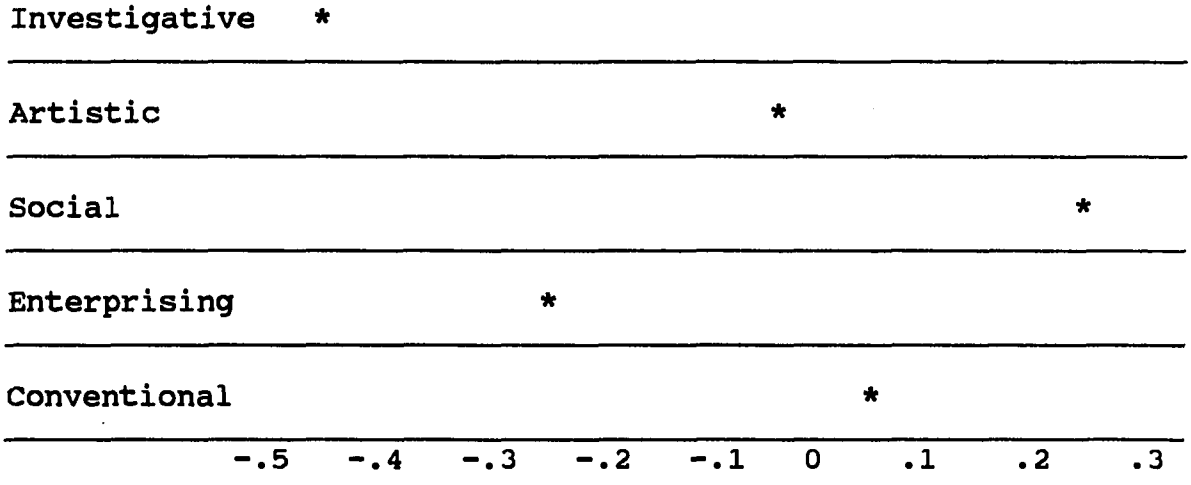

Figure 10. Group centroids for reduced model of high-point Holland codes utilizing sex-role variables

Group centroids resulting from the discriminant analyses were computed for the statistically significant function. Figure 10 reflects the group centroids on the statistically significant function.

The results from the multiple discriminant analyses for the reduced models of the high-point and two-point Holland codes, utilizing only the SEI score as the discriminating variable, are presented in Table 22. Table 22 shows the eigenvalue, percentage of variance, Wilk's Lambda, canonical correlation, chi-square test, and significance level for each discriminant function. As can be seen, only the high-point discriminant function was statistically significant.

The group centroids resulting from the discriminant analyses were computed for the statistically significant

Table 22. Canonical discriminant functions for reduced models of Holland codes utilizing self-esteem scale

Function	Eigenvalue	% Var.	Wilk's Lambda	Canonical Correlation	X^2
		High-Point Codes (n=271)			
I	.068	100.00	.937	.252	17.52*
		Two-Point Codes (n=254)			
I	.024	100.00	.977	.153	5.85

*$p < .01$.

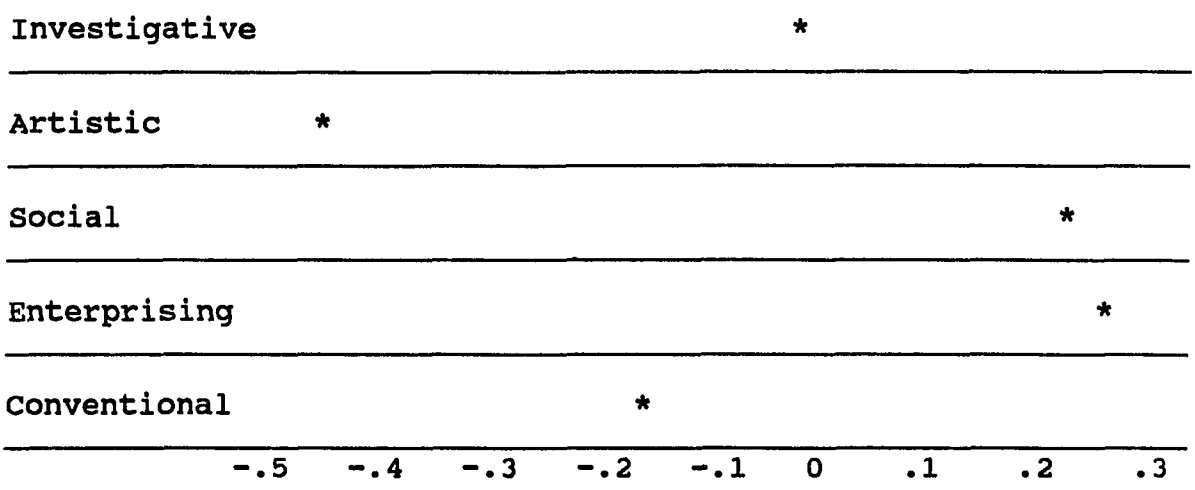

Figure 11. Group centroids for reduced model of high-point Holland codes utilizing self-esteem scale

function. Figure 11 depicts the group centroids on the high-point function.

Canonical correlations

The results from the canonical correlation analyses are shown in Table 23. The 15 biodata factors, the BSRI Masculinity and Femininity scale scores, and the SEI scores were specified as independent variables. Due to the benefits associated with utilizing an all-female normative sample and the irrelevance of ties, the interpretive Holland codes were deemed most appropriate for purposes of canonical correlation analyses. Thus, the canonical correlation analyses used the six GOT scale scores derived from the interpretive comments as the dependent variables.

Table 23 presents the eigenvalue, percentage of variance, cumulative percentage of variance, canonical correlation and squared canonical correlation for each canonical function.

Table 23. Eigenvalues and canonical correlations (n=293)

Canonical Function	Eigenvalue	%	Cum. %	Canonical Correlation	Squared Correlation
I	.749	44.94	44.94	.654	.428
II	.401	24.07	69.01	.535	.286
III	.179	10.73	79.74	.389	.152
IV	.121	7.27	87.01	.329	.108
V	.110	6.59	93.60	.315	.099
VI	.107	6.40	100.00	.310	.096

Pedhazur (1982) recommends that a squared canonical correlation of less than .10 be treated as not meaningful. Therefore, the fifth and sixth canonical functions were not retained for further interpretation.

The canonical weights, alternatively referred to as canonical function coefficients, for the four meaningful canonical functions are presented in Table 24. These weights are interpreted in a manner analogous to betas in multiple regression analysis. Accordingly, their relative magnitudes represent the relative contribution, or importance, of the variables with which they are associated. Thus, relative to the other dependent variables, Investigative (.971) appears to be the most important for the first function, Social (-.888) for the second, Realistic (1.020) for the third, and Artistic (1.023) for the fourth function. Relative to the other independent variables Scientific Interest (-1.078) seems to be the most important for the first function, Socioeconomic Status (-.592) and Femininity (-.504) for the second, Academic

Table 24. Canonical weights for meaningful canonical functions (n=293)

Variable	Function I	II	III	IV
Realistic	.115	.012	1.020	.391
Investigative	.971	.206	-.387	-.537
Artistic	-.161	.046	-.528	1.023
Social	-.171	-.880	.237	-.184
Enterprising	-.369	.683	.576	-.129
Conventional	.136	-.553	-.319	.293
Social Leadership & Popularity	.259	-.155	-.375	.640
Academic Achievement	.221	.306	.452	-.447
Freedom from Parental Control	-.116	.131	-.017	-.059
SES	.074	-.592	.145	-.339
Athletic Participation	.078	.378	-.357	-.064
Religious Activity	.073	.240	-.152	-.159
Negative Social Adjustment	.110	-.075	-.054	-.031
Warmth of Maternal Relationship	.244	.153	.081	.371
Sibling Friction	-.081	-.101	-.300	-.320
Warmth of Paternal Relationship	-.089	.195	-.011	-.072
School & Cultural Activities	-.061	-.114	-.397	-.687
Scientific Interest	-1.078	-.104	-.301	.663
Independence/Dominance	-.089	.239	.176	-.002
Positive Academic Attitude	-.011	-.109	.442	.029
Family Position	.004	.081	-.276	.295
Masculinity	-.159	.333	.185	-.043
Femininity	.046	-.504	.095	.443
Self-Esteem	-.074	.053	.304	.192

Achievement (.452) and Positive Academic Attitude (.442) for the third, and School and Cultural Activities (-.687), Scientific Interest (.663) and Social Leadership and Popularity (.640) for the fourth function. Canonical weights,

however, may be unstable due to their relationship with other variables. For this reason, structure coefficients, which are simple bivariate correlations and thus are unaffected by relationships with other variables, are recommended by psychometricians (e.g., Pedhazur, 1982; Thompson, 1984) for purposes of interpretation.

Table 25 shows the canonical structure coefficients, or loadings, for the four meaningful canonical functions. The structure coefficients represent the correlations between the

Table 25. Statistically significant canonical structure coefficients for meaningful canonical functions (n=293)

Variable	Function I	II	III	IV
Realistic	.586		.655	.462
Investigative	.901			
Artistic				.878
Social		-.767	.312	
Enterprising			.565	
Conventional		-.446		
Social Leadership & Popularity			-.393	.351
Academic Achievement	-.414			
SES		-.505		
Athletic Participation			-.448	
Religious Activity		.325		
Warmth of Maternal Relationship				.308
School & Cultural Activities	-.343		-.482	-.302
Scientific Interest	-.842			
Masculinity			.341	
Femininity		-.562		.336
Self-Esteem			.359	

variables and the canonical functions. In other words, a squared canonical structure coefficient represents the amount of variance shared by a variable and a canonical function. As a rule of thumb, Pedhazur (1982) suggests that structure coefficients greater than or equal to .30 be treated as meaningful. Thus, all 6 GOTs, 8 of 15 biodata factors, both the BSRI Masculinity and Femininity scales, and the SEI scale comprised the 4 meaningful canonical functions.

Hypotheses tests

In addition to the overall relationships examined in the above analyses, many other relationships among the three psychological constructs and Holland's personality types were explored via Pearson correlation coefficients. Table 26 presents Pearson correlations between the Holland T-score codes and the three psychological constructs, and Table 27 shows similar correlations for the Holland interpretive codes.

Statistically significant, albeit small, correlations were found between the Artistic personality type and the Femininity and Warmth of Maternal Relationship variables utilizing both the T-scores and interpretive codes. Furthermore, as hypothesized, a fairly large correlation was evident between Scientific Interest and the Investigative personality type (see Tables 26 and 27). However, none of the other hypothesized relationships were statistically significant. Because many statistically significant but nonhypothesized relationships were revealed, the correlations

Table 26. Pearson correlations between Holland T-score codes and biodata, sex-role, and SEI (n=293)

	R	I	A	S	E	C
Masculinity	-.01	-.05	-.05	-.03	.13*	-.07
Femininity	-.03	-.03	.11*	.31***	.07	.11*
Self-Esteem	.01	.01	-.05	.10*	.13*	.00
Social Lead.	.09	.07	.10*	-.13*	-.26***	-.10*
Academic Ach.	-.09	-.25***	-.01	-.05	.04	-.17***
Freedom from Parental Cntrl.	.07	.10	.05	-.09	-.02	-.07
SES	.01	-.01	-.08	.18***	-.05	.10*
Athletic Part.	-.07	.00	.04	-.18***	-.08	-.08
Religious Activity	-.04	.01	.01	-.16**	-.02	-.11*
Negative Social Adjustment	.07	.03	.00	-.13*	-.10	-.13*
Warmth of Maternal Rel.	.06	.04	.12*	-.10*	-.06	-.11*
Sibling Fric.	-.20***	-.05	-.01	.10*	.02	-.03
Warmth of Paternal Rel.	-.03	-.07	.00	-.07	-.12*	-.13*
School Act.	-.31***	-.32***	-.14**	-.07	-.18***	-.12*
Scientific Int.	-.34***	-.55***	-.02	-.02	.02	-.15**
Independence/ Dominance	-.07	-.16**	-.05	-.14**	-.06	.04
Positive Academic Attitude	.02	-.12*	-.01	-.13*	-.05	-.12*
Family Pos.	-.06	-.06	.05	-.08	-.00	-.07

*p < .05. **p < .01. ***p < .001.

Table 27. Pearson correlations between Holland interpretive codes and biodata, sex-role, and SEI (n=293)

	R	I	A	S	E	C
Masculinity	.00	-.05	-.04	-.03	.14**	-.04
Femininity	.00	-.02	.12*	.30***	.06	.15**
Self-Esteem	.02	-.03	-.04	.11*	.12*	.01
Social Lead.	.08	.10*	.12*	-.12*	-.24***	-.12*
Academic Ach.	-.09	-.25***	-.03	-.08	.04	-.17**
Freedom from Parental Cntrl.	.07	.11*	.07	-.09	-.02	-.09
SES	.02	-.00	-.07	.18***	-.08	.10*
Athletic Part.	-.08	.02	.07	-.14**	-.08	-.09
Religious Activity	-.06	.00	-.04	-.15**	-.01	-.09
Negative Social Adjustment	.08	.05	-.01	-.08	-.11*	-.14**
Warmth of Maternal Rel.	.08	.08	.12*	-.10*	-.05	-.12*
Sibling Fric.	-.18***	-.07	-.02	.11*	.03	-.02
Warmth of Paternal Rel.	-.02	-.05	.01	-.06	-.12*	-.15**
School Act.	-.29***	-.28***	-.14**	-.09	-.17**	-.13*
Scientific Int.	-.31***	-.51***	-.05	-.05	.03	-.15**
Independence/ Dominance	-.05	-.14**	-.05	-.14**	-.06	.01
Positive Academic Attitude	.02	-.12*	-.02	-.13*	-.06	-.14**
Family Pos.	-.06	-.06	.06	-.08	-.02	.05

*p < .05. **p < .01. ***p < .001.

between the Holland personality types and all three psychological constructs are presented for the reader's perusal.

Secondary Analyses

Pearson correlations

The analyses described in this section were conducted to better understand the relationships between and among life history experiences, sex-roles and self-esteem. Table 28 presents the bivariate intercorrelations among life history factors. The average interfactor correlation was .13, with the highest correlation being a .69 between Scientific Interest and Academic Achievement. Overall, with the exception of a few large correlations, the factors were relatively orthogonal as in previous investigations (e.g., Eberhardt & Muchinsky, 1982a, 1982b; Graef et al. 1985).

Correlations between sex-role variables and biodata factors, self-esteem and biodata factors, and self-esteem and sex-role variables are shown in Table 29. The statistically significant correlations ($p < .05$) ranged from an absolute value of .11 to .51 between Independence/Dominance and Masculinity.

Multiple regressions

Table 30 presents the results of the multiple regression analyses. Included are the statistically significant beta

Negative Social Adjustment	Warmth of Matern Relationship	Sibling Friction	Warmth of Patern Relationship	School Activities	Scientific Int.	Independence/ Dominance	Positive Academic Attitude	Family Position
-								
.34***	-							
.07	-.18***	-						
.24***	.54***	-.16**	-					
-.07	.08	-.06	.14**	-				
-.00	.21***	.01	.19***	.41***	-			
-.05	.11*	-.05	.12*	.34***	.30***	-		
.06	.28***	-.12*	.23***	.26***	.40***	.44***	-	
-.04	.07	.05	.08	.12*	.11*	-.03	.15**	-

Table 29. Pearson correlations among biodata, sex-role and self-esteem variables (n=296)

	Masculinity	Femininity	Self-Esteem
Masculinity	1.00		
Femininity	.07	1.00	
Self-Esteem	.31***	.04	1.00
Social Leadership & Popularity	-.43***	-.14**	-.41***
Academic Achievement	-.09	-.02	-.21***
Freedom from Parental Control	-.09	-.11*	-.35***
SES	-.11*	.08	-.13*
Athletic Participation	-.18***	.07	-.14**
Religious Activity	-.02	-.04	-.12*
Negative Social Adjustment	.06	-.15**	.04
Warmth of Maternal Relationship	-.10	-.11*	-.48***
Sibling Friction	-.02	.07	.24***
Warmth of Paternal Relationship	-.09	-.08	-.29***
School Activities	-.13*	.03	-.14**
Scientific Interest	-.11*	.11*	-.20***
Independence/Dominance	-.51***	-.05	-.24***
Positive Academic Attitude	-.21***	-.15**	-.27***
Family Position	.08	-.01	-.01

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 30. Multiple regression results (n=296)

Dependent Variable	Independent Variable	B	R	R^2	Adjusted R^2	F
Masculinity	Sibling Friction	-.095	.583	.340	.304	9.61**
	Social Leadership & Popularity	-.267				
	Independence/ Dominance	-.443				
Femininity	SES	.126	.333	.111	.063	2.33*
	Athletic Participation	.134				
	Social Leadership & Popularity	-.149				
	Scientific Interest	.159				
	Positive Academic Attitude	-.177				
Self-Esteem (Full Model)	Sibling Friction	.106	.633	.400	.363	10.91**
	Freedom from Parental Control	-.129				
	Negative Social Adjustment	.188				
	Masculinity	.188				
	Social Leadership & Popularity	-.230				
	Warmth of Maternal Relationship	-.326				
Self-Esteem (Reduced Model I)	Sibling Friction	.088	.613	.375	.342	11.21**
	Freedom from Parental Control	-.134				
	Negative Social Adjustment	.203				
	Social Leadership & Popularity	-.273				
	Warmth of Maternal Relationship	-.327				
Self-Esteem (Reduced Model II)	Masculinity	.662	.312	.097	.088	10.52**

*p < .01. **p < .001.

weights ($p < .10$), multiple correlation coefficients, squared multiple correlation coefficients, the multiple correlation coefficients adjusted for shrinkage and the significance tests (F-tests). Significant prediction was obtained for all regression equations.

When the BSRI Masculinity scale was regressed on the 15 BQ factors, high scores on Masculinity ($R^2 = .304$) were predicted for those women who experienced competition and friction with their siblings, exhibited social leadership and popularity with men, and were independent and dominant. When Femininity was regressed on the 15 biodata factors, those women with low socioeconomic status and limited athletic participation and scientific interest, but exhibiting high degrees of social leadership and popularity with men and a positive academic attitude tended towards high femininity ($R^2 = .063$).

Self-esteem was regressed on the BSRI scales and the 15 biodata factors, both simultaneously (full model), and independently (reduced models I and II). In the full model, high self-esteem ($R^2 = .363$) was predicted for masculine women with positive relations with their siblings and mothers, who were socially well adjusted, had freedom from parental control and exhibited social leadership and popularity with men. For the reduced model utilizing only the 15 biodata factors, the same factors were predictive of self-esteem, absent Masculinity ($R^2 = .342$). Finally, for the reduced model

utilizing the BSRI Masculinity and Femininity scale scores and their interaction, Masculinity was the only factor predictive of self-esteem (R^2 = .088).

DISCUSSION

Interpretation of Statistical Results

Primary analyses

The analyses discussed in this section were conducted to better understand the relationship between life history experiences, sex-roles, self-esteem and vocational type. That is, vocational type was specified as the dependent variable and the other constructs served as independent variables for purposes of multiple discriminant and canonical analyses.

Multiple discriminant analysis is best used to interpret the multivariate structure of the data, as aided by testing for the number of statistically significant discriminant functions, the statistical relationship between the discriminating variables and the discriminant functions, and a plot of the centroids in discriminant space (Klecka, 1980). Canonical analysis, on the other hand, is employed to investigate the extent to which one set of variables is predicted or explained by another set of two or more variables, as aided by deriving canonical functions and examining the statistical relationships between the variables and the canonical functions (Thompson, 1984).

Multiple discriminant analyses For both high-point and two-point codes, the results of the multiple discriminant analyses support the hypothesis that a woman's vocational type

is shaped to some extent by certain of her life history experiences. The importance of sex-roles and self-esteem is less clear for the high-point codes. For the full model, where life-history experiences, sex-roles and self-esteem are simultaneously used to discriminate among the IASEC high-point codes, self-esteem is not statistically meaningful and of the sex-role variables only Femininity is meaningful (see Table 10). Relative to all other variables in the model, however, self-esteem appears to contribute more to the discriminant functions than sex-roles (see Table 9). Moreover, when self-esteem is used as the sole discriminating variable, it explains slightly more of the variance in vocational type (where R^2 = 1-Lambda, R^2 = 6%) than do sex-roles when they are used as the only discriminating variables (5%), although both discriminant functions are statistically significant (see Tables 20 and 22). On the other hand, when two-point codes are used as dependent variables, sex-roles and self-esteem do not appear to predict vocational type for any of the models.

The statistically significant canonical discriminant functions derived from both the high-point and two-point code full models (all 18 discriminating variables) demonstrated significant explanatory power. According to Pedhazur (1982) one may conceive of 1-Lambda as a generalization of R^2 for a single function. Thus, for the high-point code full model, the first function explained approximately 44% of the variance in group membership, and the second function described 27% of

such variance (see Table 8). Similarly, for the two-point code full model, the first function predicted an impressive 60% of the variance in group membership, while the second and third functions explained approximately 47% and 35% of the variance, respectively (see Table 11).

As shown in Figure 2, the plotted centroids for the two discriminant functions for the full model, which utilized high-point Holland codes (IASEC) as the group variables and all 18 discriminating variables, reveal that Investigative females are most differentiated from Social females on the first function. Investigative subjects exhibited much greater scientific interest and participated less in athletics, exhibited less social leadership and popularity, and were less feminine than Social females (see Table 10). These findings seem logically consistent with Holland's theory (see Table 1). Holland describes Investigative types as possessing scientific ability and interests, as opposed to athletic interests, and unpopular. The fact that Investigative women tended to be less feminine than Social females may be due to the fact that math and science are not stereotypically feminine interests. Moreover, Holland describes the Social personality type in terms of adjectives used by Bem (1981) on her Femininity scale, e.g., understanding. Social types are also described by Holland as valuing social activities, consistent with this author's findings that Social females participate in more athletic events and are more popular than other types.

On the second function for the above model (full model, high-point codes), Artistic and Enterprising subjects were most differentiated from Investigative women. Artistic and Enterprising females exhibited much less scientific interest and academic achievement, had fewer younger siblings close to their age, and had higher socioeconomic status than Investigative females. These findings are consistent with Holland's description of the Investigative, Enterprising and Artistic types. As mentioned above, the Investigative type is described by Holland as possessing scientific ability. Holland describes the Enterprising type as lacking scientific ability and valuing economic achievement. Artistic types are described as valuing aesthetic qualities, which may reflect higher socioeconomic status and concern with the arts, rather than the sciences. The fact that one's position in a family discriminates between the Holland types is perplexing.

When the two-point codes were introduced as group variables in the full model (18 discriminating variables), the Investigative types were again most differentiated from all others on the first function (see Figure 3). Specifically, the Investigative/Social (IS) subjects were most differentiated from Artistic/Enterprising (AE) and Social/Enterprising (SE) females. The IS subjects had a greater amount of scientific interest, more younger siblings close to their age, and exhibited less social leadership and popularity than AE or SE women (see Table 13). This logically

conforms to Holland's personality types in that Enterprising types are described by Holland as possessing leadership and persuasive abilities, while Investigative types are described as reserved and unpopular individuals with high scientific ability. Again, however, this author is unable to explain why the number of younger siblings close to an individual's age has discriminating power.

The second function for the full model, which employed the two-point Holland codes and 18 discriminating variables, reveals that Artistic/Enterprising (AE) females are most differentiated from Social/Conventional (SC) subjects (see Figure 3). The AE subjects had high economic status, a negative academic attitude, and participated infrequently in athletics, whereas SC subjects tended to have low socioeconomic status and positive academic attitudes, and participated frequently in athletics. As previously discussed, the fact that AE subjects exhibited higher socioeconomic status is consistent with the aesthetic and economic achievement values Holland used to describe these types. The finding that SC females exhibited positive academic attitudes and participated in athletics is consistent with Holland's description of SC types as conscientious and involved in social activities. Finally, the fact that AE types were not athletic participants and had negative academic attitudes parallels the description of AE types as nonconforming and lacking scientific interest.

The third function of the same model illustrates that Investigative/Social (IS) females are most differentiated from Investigative/Artistic (IA) subjects (see Figure 4). The IS subjects exhibited more social leadership and popularity, experienced less sibling friction, and had more younger siblings close to their age than IA females. Because Holland describes IS types as valuing social activities and IA subjects as nonconforming, the finding that IS subjects were popular is consistent with Holland's theory. However, the discriminating power of sibling friction and position in family is unexplainable in terms of Holland's theory.

Multiple discriminant analyses were also conducted utilizing selected discriminating variables (reduced models). The first reduced model specified the biographical variables as discriminating variables and the Holland high-point codes as group variables. As can be seen in Table 16, the same biodata factors as in the full model contributed significantly to each of the two statistically significant functions. Figure 6 illustrates that, as with the full model, Investigative females were most differentiated from Social types on the first function. Moreover, as with the full model, Investigative subjects tended to exhibit less social leadership and popularity and athletic participation, but more scientific interest, than Social females.

Similar to the full model, Investigative females were most differentiated from Enterprising and Artistic subjects on

the second function. Again, as with the full model, Investigative females tended to have more younger siblings close to their age, exhibit more academic achievement and scientific interest, but lower socioeconomic status, than Enterprising or Artistic women.

A second reduced model which specified the biodata factors as discriminating variables was utilized for the two-point Holland codes. Although the same variables as in the full model were significant discriminators on the first function, the second and third functions were significantly different (see Table 19). Consistent with the full model, Investigative/Social (IS) females were most differentiated from Social/Enterprising (SE) and Artistic/Enterprising (AE) women on the first function (see Figure 7). As with the full model, IS females had more scientific interest and more younger siblings close to their age, but exhibited less social leadership and popularity, than SE or AE women.

Although Social/Conventional (SC) subjects were most differentiated from Artistic/Enterprising (AE) women on the second function for both the full and reduced models, the significant biodata factors comprising the second function were different. In the reduced model for two-point codes, five biodata variables significantly discriminated between the groups, as compared to only three in the full model. Although, as in the full model, reduced model SC females exhibited lower socioeconomic status, more athletic

participation and a more positive academic attitude than AE females, SC subjects also exhibited more independence and dominance and had more younger siblings closer to their age than AE women.

Differences between the two-point code full model and this reduced model (biodata factors only) were also found on the third function. As with the full model, Investigative/Social (IS) subjects were most differentiated from Investigative/Artistic (IA) females on the third function (see Figure 8). However, the significant discriminating variables comprising the third function of the reduced model were different from those of the full model. The only similarity between the two models on the third function was that IA females experienced more sibling friction than IS subjects. Otherwise, for the reduced model, IA females exhibited greater academic achievement, more religious activity, and more scientific interest than IS women. The finding that scientific interest discriminates between Investigative types is seemingly inconsistent with Holland's theory. Recall, however, that this study reduced the number of two-point categories by classifying both IS and SI subjects as IS subjects. Thus, if there were more SI subjects than IS subjects, the discrimination evidenced may actually be between SI and IA subjects, and not between IS and IA subjects. Moreover, this author is hard-pressed to find an explanation as to why academic achievement and religious activity hold

such discriminating power here.

Reduced models which utilized only the two sex-role variables as discriminating variables were also formulated for both the high-point and two-point codes. The functions extracted for this two-point code reduced model were not statistically significant, however (see Table 20). For the single statistically significant discriminant function in this high-point code reduced model, Investigative females were most differentiated from Social women (see Figure 10). Overall, this reduced model shows that Investigative females tended to be less feminine than Social women (see Table 21). This is consistent with Holland's theory in that, stereotypically, females do not exhibit as many of the Investigative characteristics, e.g., mathematical and scientific ability, as they do Social characteristics, e.g., understanding, cooperativeness, friendliness.

Two final reduced models were formulated for both the high-point and two-point codes utilizing self-esteem as the single discriminating variable. No statistically significant function was derived for the two-point codes (see Table 22). Although a statistically significant function was derived for the high-point code reduced model, its explanatory power is slight when measured in terms of the extracted canonical correlation and eigenvalue. Nonetheless, this function illustrates that Artistic females were most differentiated from Social and Enterprising (see Table 11), and greater self-

esteem was exhibited by Social and Enterprising females than by Artistic women.

Canonical correlational analysis Turning to the canonical analysis, it will be noted that four squared canonical correlations are meaningful and statistically significant (i.e., greater than .10) (see Table 23), and thus four canonical functions will be described. Among the biodata variables with high structure coefficients on the first function were: Academic Achievement (-.414), School and Cultural Activities (-.343) and Scientific Interest (-.842) (see Table 25). While Scientific Interest dominates the function, the structure coefficients reveal that this function primarily consisted of biodata factors associated with educational activities and interests. It is important to note that there are no meaningful loadings for the sex-role or self-esteem variables. In other words, the three educational biodata factors are particularly predictive of the Holland codes on the first function.

The second canonical function is primarily a bipolar factor, with Religious Activity (.325) and Femininity (-.562) on one side and Socioeconomic Status (-.505) on the other (recall that the biodata factors are inversely scored). It appears, then, that the second function for the biodata factors reflects high socioeconomic status and low religious activity, and low femininity. Again, Self-Esteem does not play a significant role.

The third function is dominated by high Social Leadership and Popularity (-.393), Athletic Participation (-.448), School and Cultural Activities (-.482), Masculinity (.341) and Self-Esteem (.359). This function, then, appears to represent an overall dimension of confident, aggressive social involvement, and includes variables from each of the three psychological constructs--i.e., biodata, sex-roles and self-esteem.

The fourth and final function appears to be bipolar, with low Social Leadership and Popularity (.351) and Warmth of Maternal Relationship (.308) on one side, and high Masculinity (.336) and involvement in School and Cultural Activities (-.302) on the other. As with the first and second functions, self-esteem plays a nonsignificant role on the fourth function.

Hypotheses tests Many other relationships between the biodata, sex-role and self-esteem variables and the Holland personality types were also explored. Specifically, nine hypothesized relationships were examined via Pearson correlational analyses. As hypothesized, a fairly large correlation was found between Scientific Interest and the Investigative personality type for both the T-score codes (-.55) and the interpretive codes (-.51) (see Tables 26 and 27). While the hypothesized relationship between the Artistic personality type and Femininity and Warmth of Maternal Relationship were supported in terms of statistical significance, the resulting correlations were of questionable

substantive value. The Pearson correlation between Artistic and Femininity was only .12 when the interpretive codes were utilized, and a mere .11 when the T-scores were used. Moreover, the Pearson correlation between Warmth of Maternal Relationship and Artistic was .12 for both the T-score and interpretive codes.

No statistically significant correlations were obtained for the remaining six hypothesized relationships: Realistic and Masculinity; Realistic and Self-Esteem; Realistic and Socioeconomic Status; Realistic and Warmth of Paternal Relationship; Realistic and Freedom from Parental Control; and Artistic and Self-Esteem. The following substantial and intuitively logical, but unhypothesized, relationships were found: Social and Femininity (.31); Social Leadership and Enterprising (-.26); Academic Achievement and Investigative (-.25); School and Cultural Activities and Realistic (-.31); School and Cultural Activities and Investigative (-.32); and Scientific Interest and Realistic (-.34) (see Table 26). Most of these relationships were also revealed via the multiple discriminant analyses. Perhaps future research could investigate the nature of these relationships in greater detail.

Secondary analyses

The analyses discussed in this section were conducted to assess the relationships among the three psychological constructs (life history experiences, sex-roles and self-

esteem). Initially, several ordinary least squares multiple regression analyses were calculated using the biodata, sex-role and self-esteem variables. The first set of these analyses was conducted to assess how well biodata factors predict sex-roles. As can be seen in Table 30, biodata factors explained more variance in Masculinity (Adjusted R^2 = .30) than in Femininity (Adjusted R^2 = .06). In particular, the variance in Masculinity was best explained by three biodata factors: Sibling Friction, Social Leadership and Popularity, and Independence/Dominance. Thus, high levels of sibling friction, social leadership and popularity, and independence and dominance were predictive of high masculinity for female subjects.

Although the biodata factors accounted for much less of the variance in Femininity, that amount which was explained was statistically significant at the .01 level. Five variables were particularly predictive of Femininity: Socioeconomic Status, Athletic Participation, Social Leadership and Popularity, Scientific Interest, and Positive Academic Attitude. Thus, women exhibiting high femininity tended to come from low socioeconomic backgrounds, rarely participated in athletics, had minimal scientific interest, and displayed positive academic attitudes and social leadership and popularity.

Further inspection of the specific predictors that entered into these two regression equations yields several

observations. First, Social Leadership and Popularity was a consistently good predictor of sex-roles. Second, almost half of the biodata factors (seven of fifteen) appear to be of particular importance in explaining the variance in sex-role orientation. Third, there were significant differences between the loadings of the biodata factors as a group and each factor's independent correlation with the sex-role variables. For example, Athletic Participation and Socioeconomic Status were significantly correlated with Masculinity (see Table 29), but loaded significantly when Femininity, not Masculinity, was regressed on them. Similarly, Scientific Interest and Positive Academic Attitude were significantly correlated with both Masculinity and Femininity, but loaded significantly only in the Femininity regression equation. Finally, Sibling Friction was not significantly correlated with either Masculinity or Femininity, but it loaded significantly in the Masculinity regression equation nonetheless, possibly due to the significant intercorrelation between Sibling Friction and Social Leadership and Popularity (-.18) (see Table 28).

A second set of multiple regression analyses was conducted utilizing Self-Esteem as the dependent variable. Collectively all fifteen biodata factors and the sex-role variables accounted for 36% of the variance in self-esteem. When the sex-role variables and fifteen biodata factors were specified together as independent variables (full model), five

biodata factors and one sex-role variable were particularly predictive of self-esteem: Sibling Friction, Freedom from Parental Control, Negative Social Adjustment, Social Leadership and Popularity, Warmth of Maternal Relationship and Masculinity. When the sex-role variables were removed from the regression equation, the same five biodata factors that were especially predictive in the full model were of particular importance in explaining the variance in self-esteem. Moreover, the biodata factors alone accounted for 34% of the variance in self-esteem, suggesting that the predictive contribution of the sex-role variables was slight. Overall, then, it appears that females who are socially well-adjusted, experience limited sibling friction, are free from parental control, have warm maternal relationships, and display high levels of social leadership and popularity with males tend to exhibit high self-esteem. When sex-roles were included, high levels of masculinity were also predictive of high self-esteem.

A final multiple regression equation was calculated to test the androgynous, congruence, masculinity, and interactive androgyny models of self-esteem. In this model self-esteem was regressed on the Masculinity and Femininity variables, as well as an interaction term (Masculinity X Femininity). Combined these variables accounted for a statistically significant, albeit moderate, 9% of the variance in self-esteem. Because Masculinity was the only variable that loaded

significantly in the equation, the masculinity model of self-esteem was supported, i.e., high masculinity alone was predictive of high self-esteem for females.

Overview of Statistical Results

This section is designed to give a broad overview of the statistical results discussed above. Table 31 illustrates the biodata, sex-role and self-esteem variables that were most (and least) discriminating of vocational classification. Among the biodata factors Social Leadership and Popularity, Socioeconomic Status, Athletic Participation, Scientific Interest, and Position in Family demonstrated statistically significant discriminating power in each of the four models in which they were employed. Similarly, Academic Achievement exhibited substantial discriminating power in three of the four models in which it was utilized. On the other hand, Freedom from Parental Control, Negative Social Adjustment, Warmth of Maternal and Paternal Relationships, School and Cultural Activities, failed to demonstrate statistically significant discriminating power in any of the models in which they were used. Also note that Religious Activity, Sibling Friction, Independence/Dominance and Positive Academic Attitude demonstrated statistically significant discriminating power only for the two-point codes. Thus, 10 of the 15 biodata factors were discriminating in at least one of the

Table 31. Summary of discriminating power of biodata, sex-role and self-esteem variables for each multiple discriminant model (X = statistically significant)

	High-Point Codes				Two-Point Codes			
Variable	Full	R1[a]	R2[b]	R3[c]	Full	R1[a]	R2[b]	R3[c]
Social Leadership & Popularity	X	X			X	X		
Academic Achievement	X	X				X		
Freedom from Parental Control								
Socioeconomic Status	X	X			X	X		
Athletic Participation	X	X			X	X		
Religious Activity						X		
Negative Social Adjustment								
Warmth of Maternal Relationship								
Sibling Friction					X	X		
Warmth of Paternal Relationship								
School & Cultural Activities								
Scientific Interest	X	X			X	X		
Independence/Dominance						X		
Positive Academic Attitude					X	X		
Position in Family	X	X			X	X		
Masculinity								
Femininity	X		X					
Self-Esteem				X				

[a]Reduced model using biodata factors only.

[b]Reduced model using sex-roles variables only.

[c]Reduced model using self-esteem scale only.

four models in which they were employed.

Sex-roles and self-esteem seemed to be of less value in discriminating among vocational classifications (see Table

31). Femininity was the most discriminating, demonstrating statistically significant discriminating power in both of the high-point code models it was employed in. Masculinity, on the other hand, failed to demonstrate statistically significant discriminating power in any of the four models in which it was used. Self-esteem was also of limited value, showing statistically significant discriminating power only in the high-point code model in which it was the sole discriminating variable. Thus, including sex-roles and self-esteem as discriminating variables was of limited value.

Upon examination of Table 31, one may devise many post hoc explanations of why these variables operated as they did. For example, Social Leadership and Popularity should logically discriminate among Holland types, because Holland uses friendly as an adjective to describe the Social personality type and unpopular as an adjective to describe the Investigative personality type. Scientific Interest should also demonstrate a high level of discriminating power, since Holland uses high scientific ability to describe the Investigative personality type and lack of scientific ability to describe the Enterprising personality type. Socioeconomic Status also demonstrated a high level of discriminating power, which may be linked to the overall differences in earning power for the Holland personality types. For example, Investigative occupations may be higher paying than Social occupations.

The discriminating power of Athletic Participation may be due to the social aspect of participation and therefore be consistent with Holland's distinction between Social individuals as valuing social activities and Investigative individuals as being reserved. Finally, Position in Family had discriminating powerin each of the four models in which it was employed. This author could find no literature to help explain the discriminating power of this factor. However, one should keep in mind that this factor may be indirectly related to Holland personality types, thereby defying a simple explanation.

The finding that two of the biodata factors, Sibling Friction and Positive Academic Attitude, were discriminating only for the two-point code models in which they were used is noteworthy. The major reason for this distinction is probably due to the larger number of groups among the two-point codes, as compared to the high-point codes. That is, because three statistically significant functions were derived for the two-point codes in this study, the probability of finding more statistically significant discriminating variables was greater than for the two statistically significant functions derived for the high-point codes. However, it should be noted that logical explanations for the discriminating power of both of these variables can easily be derived from Holland's work. For instance, Holland describes the Social personality type as cooperative, suggesting a lack of Sibling Friction. Moroever,

Table 32. Summary of statistically significant biodata and sex-role predictors for each multiple regression model (X = statistically significant)

	Sex-Roles		Self-Esteem		
Variable	Masc.	Fem.	Full	R1[a]	R2[b]
Social Leadership & Popularity	X	X	X	X	
Academic Achievement					
Freedom from Parental Control			X	X	
Socioeconomic Status		X			
Athletic Participation		X			
Religious Activity					
Negative Social Adjustment			X	X	
Warmth of Maternal Relationship			X	X	
Sibling Friction	X		X	X	
Warmth of Paternal Relationship					
School & Cultural Activities					
Scientific Interest		X			
Independence/Dominance	X				
Positive Academic Attitude		X			
Position in Family					
Masculinity			X		X
Femininity					

[a]Reduced model using biodata factors only.

[b]Reduced model using sex-role variables only.

Positive Academic Attitude is reflected in Holland's description of the Enterprising personality type as ambitious, and the Investigative type as analytical and intellectual.

Table 32 shows the variables that were the most (and least) predictive of sex-roles and self-esteem. Similar to

the multiple discriminant analyses, Social Leadership and Popularity played an important role. It was the only biodata variable that was a statistically significant predictor in each multiple regression in which it was utilized. Masculinity was also a statistically significant predictor in both of the self-esteem models in which it was used. Thus, although Masculinity was of limited value in discriminating among vocational classifications, it was valuable in predicting self-esteem.

Three biodata factors were predictive of self-esteem, but not of sex-roles: Freedom from Parental Control, Negative Social Adjustment, and Warmth of Maternal Relationship. This makes intuitive sense, since sex-roles and self-esteem are distinct concepts. Furthermore, although Academic Achievement and Position in Family demonstrated discriminating utility, they were not statistically significant predictors of either self-esteem or sex-roles. Similarly, Religious Activity and Femininity, which demonstrated moderate discriminating power, were not statistically significant predictors in any of the regression equations in which they were employed. Finally, Warmth of Maternal Relationship and School and Cultural Activities did not demonstrate discriminating or predictive power.

Conclusions

The results presented here for the primary analyses demonstrate the validity of using life history information, sex-roles and self-esteem to predict female vocational preferences. In particular, sets of biographical variables effectively discriminated among Holland high-point and two-point codes. This finding suggests the utility of using specific life history information to predict female vocational preferences. The results of the primary analyses were consistent with those reported by Eberhardt and Muchinsky (1982b). They also reported that female vocational preferences could be predicted with some accuracy when life history experiences were used as the discriminating variables. In fact, they reported that 51.8% of the variance in IASEC group membership was explainable by biodata information for females. However, one should note that this was the only study this author could locate that utilized the SCII to classify subjects according to Holland's typology. Most of the studies available used either the Vocational Preference Inventory or the Self-Directed Search. Thus, this investigation also indicated that the SCII is very valid and useful instrument for investigating female vocational preferences.

Because their overall discriminating power was not as great as that of biographical information, sex-roles and self-

esteem seem to be of secondary importance in understanding women's vocational preferences. Moreover, since the variables that discriminated between particular Holland codes seemed to conform with Holland's description of those codes, Holland's theory appears generally applicable to the cohort of women selected for this study.

Furthermore, sets of predictor variables obtained in the regression analyses appear to suggest typologies or biographical profiles upon which individuals can be differentiated in terms of sex-roles and self-esteem. Finally, the secondary analyses suggest support for the masculinity model of self-esteem, which is consistent with the literature.

Future research in this area should be prepared to address several general issues. These issues are briefly discussed in terms of the instruments chosen, the use of self-report data, sampling, and social desirability.

Methodological Issues

The measurement instruments

The SCII Many researchers suggest that the use of the SCII in conjunction with Holland's theory tends to perpetuate the current labor force segmentation between males and females in our society. For example, Moore and Ollenburger (1987) argue that the use of the SCII to study Holland's theory

"provides one mechanism that replicates and legitimates sex segmentation in the labor market that is associated with current patterns of women's paid labor force participation" (p. 513). In other words, it is suggested that the SCII is patterned after a segmented, discriminatory labor market structure and encourages job seekers to reproduce a sex-segregated labor market by channeling women into traditionally "female" jobs.

Concern prevails about which SCII GOT scores to utilize. Gottfredson (1982) suggests that the use of sex-normed scores is manipulative in vocational assessment, because it causes counselors to get people into jobs that conform to someone else's version of what society should look like. Only by using raw scores can the person find jobs he or she likes and in which he or she displays competence, e.g., if a female's interests are stereotypically feminine, then she can be encouraged to examine whether these interests are really her own or reflections of what she thinks is expected of her as a woman. However, Prediger (1982) notes that research comparing raw and normed interest scores does <u>not</u> support the use of raw interest scores in counseling. The present study revealed no significant differences between raw and interpretive scores, other than on the frequencies of personality types (as measured by high- and two-point codes).

Some caution in the interpretation of female scores on the SCII GOTs in terms of the sets of contrasts and

descriptors typically being used to describe the Holland personality type must be exercised. Rounds et al. (1979) reported that female responses to Holland's scales on the SCII fit the RIASEC hexagonal model less well than male responses. Furthermore, research by Eberhardt and Muchinsky (1984) points to the importance of paying special attention the dissimilar frequency of the RIASEC types in the sample. Marked skewness in the distribution of vocational types should be avoided since it can directly influence the overall findings. Because, as in the present study, few women exhibit Realistic personality types, skewness in female samples may be hard to avoid.

Traditionally, men have scored higher on scales assessing interests in scientific, technical and mechanical activities, whereas women have scored higher on scales assessing interests in social, artistic and clerical activities. To support this claim Fitzgerald and Betz (1983) reviewed research on the SCII and found that men have consistently had higher Realistic, Investigative and Enterprising GOTs, and women have had higher scores on Artistic, Social and Conventional GOTs. Moreover, Hansen (1988) found that differences in interests of women and men continue to persist, especially in the Realistic areas (favored by men) and the Artistic areas (favored by women) of interests. However, the general trend is in a reduction in differences in a large number of interest areas.

A final concern with the use of the SCII is that it

clearly instructs respondents to rate their interests, not their abilities. However, research on the relationship between perceived ability and interests has suggested that such responses are mediated by expectations of personal effectiveness. Moreover, women tend to take less mathematics in high school and score lower on standardized math tests than men. These differences may be related to self-efficacy in math, which, in turn, may be related to fewer women scoring high on the Realistic and Investigative GOTs. Thus, Lapan et al. (1989) concluded that gender had an impact on math preparation and math self-efficacy, and that these factors explained Realistic and Investigative GOT standard score differences between men and women.

The BSRI Whitley (1988) reported some concern about the validity of sex-role measures. He claimed that self report trait and behavior measures of sex-role orientation may lack adequate convergent validity. Moreover, according to Whitley (1988), trait measures of masculinity may not show adequate discriminant validity relative to self-esteem.

Several problems and issues relate to the construction and use of the BSRI. For instance, Bem used a strictly empirical approach to test construction, rather than constructing the measure consistent with definitions of masculinity and femininity. The appropriateness of the empirical approach is very doubtful when the primary concern is on construct validity. Moreover, Bem's exclusive reliance

on the statistical characteristics of the items (e.g., difficulty, discrimination) for their selection may have lead to the neglect of test validity. Furthermore, Bem's characterization of both the masculine and feminine traits as positive on the BSRI is questionable. In fact, an empirical study conducted by Pedhazur and Tetenbaum (1979) revealed that several of the feminine traits (e.g., "gullible" and "childlike") are negative (i.e., not socially desirable). In addition, when examining the statistical properties of the twenty neutral traits found on the long form, sixteen were found to be sex-related. Finally, Pedhazur and Tetenbaum (1979) concluded that "Bem's effort to construct measures of masculinity and femininity was destined to fail, as it was based solely on an empirical approach in which trait selection was determined by a multitude of nonindependent univariate tests of significance" (p. 1012).

Pedhazur and Tetenbaum's (1979) criticisms are generally directed at Bem's failure to provide a clear statement about the aspects of stereotypes that she is interested in. Also, it has been demonstrated that the format and the conditions under which stereotypes are elicited affect the results. Nonetheless, Moore and Rosenthal (1980) reported that adjectives chosen as masculine and feminine by Bem for her instrument are also appropriately masculine- and feminine-typed in Australian culture, suggesting that the BSRI can be validly used there.

Additional research indicates that the discrimination between men and women on the BSRI is almost exclusively due to their self-rating on the masculine and feminine traits. That is, knowledge of respondents' self-ratings on the remaining thirty-eight traits adds little to the knowledge obtained from their ratings on the masculine and feminine traits (Pedhazur & Tetenbaum, 1979). Bem's response to several of these criticisms was to create the short form of the BSRI.

The SEI The measurement of self-esteem has also raised concern in the research community. For example, Tharenou (1979) argued that the lack of situational and behavioral referents increased error variance in the measurement of self-esteem. In a related vein, scales that require a judgment of whether each statement is "like me" or "unlike me" may be misleading, because a subject may disapprove a likeness that is ascribed a positive value by the researcher.

Tharenou (1979) claims that global self-esteem can be a personality trait and/or a response to environmental stimuli. Additionally, Bailey and Mednick (1988) found that global scales of self-esteem were poor predictors of women's achievement. However, most research in this area has employed global self-evaluative measures and has thus assumed that self-evaluations are stable and remain constant across dimensions of self-esteem and situations. These global measures of self-esteem may be too general to permit specific

behavioral predictions. Future researchers may want to employ dimensional self-esteem scales.

It has also been suggested that "there is a danger that self-esteem measures may come to reflect values deemed important by the culture, and these might differ considerably from the ideal for personal contentment" (Robson, 1988, p. 6). Thus, it may be that the steady increase in self-esteem in late adolescence is related less to increasing self-acceptance than to indoctrination into society's values.

Finally, while the masculinity model of self-esteem has been the most widely supported, the strength of observed relationships between sex-role orientation and self-esteem may vary as a function of the type of self-esteem measure used in the study (Dorgan et al., 1983; Whitley, 1983).

Self-report data

While verifiable items are unlikely to be falsified in self-reports, the relationship between inventoried vocational interests and the behavioral expression of such interests is less than perfect. Taken together, self-report surveys have generally been found to provide accurate information. Cascio (1975) found, for example, that individuals tend not to distort their responses to life history questions. Moreover, self-ratings of sex-related attributes can, in principle, be accorded the same degree of confidence as other self-report measures (Spence et al., 1975). From the scant research that has been conducted on self-report data, then, it can be

inferred that the information obtained in the present study is generally accurate.

Sampling

Technically, one cannot generalize to the noncollege population with college student data from a single school and a restricted age range. College samples tend to be biased, for example, toward a higher socioeconomic status population. Moreover, the fact that the present study was conducted toward the end of the spring semester may have affected the means of some life history factors. For instance, the academic achievement factor mean may be slightly lower than if the study had been conducted earlier in the semester. Self-esteem may also be slightly lower on the whole than if the present study had been conducted at an earlier date.

Soliciting information from college students tells very little about the degree of commitment attached to career goals or about life experiences likely to modify them. Nonetheless, reasonable congruence between women's career plans and later career situations has been reported by Jenkins (1989). Moreover, the fact that students in the present study had a variety of majors and diverse interests helps to avoid the problems associated with range restriction. Finally, the movement of women into male-dominated fields is likely to be at the professional level and involve college-educate women.

Social desirability

Methodological issues related to social desirability are compounded in studies of sex-role/self-esteem relationships. If masculinity and femininity items are consistently high in terms of social desirability, then the relationship between masculinity and/or femininity and self-esteem may be due to the social desirability of those items rather then their masculinity or femininity content. Moreover, if the social desirability of masculinity items differs significantly from that of femininity items, then the differential influence of masculinity and femininity on the prediction of self-esteem may be due to differences in social desirability rather than differences in their content.

Marsh et al. (1987) found that self-esteem and social desirability were indeed distinct concepts. This conclusion was based on the fact that self-esteem was more positively correlated with masculinity than femininity, whereas social desirability was more closely associated with femininity than masculinity. This suggests that self-esteem may be a masculine psychological construct, while social desirability may be a feminine construct. The notion of self-esteem measures as being more masculine than feminine has been suggested in other research. However, the implication that social desirability measures may be inherently feminine contradicts prior suggestions that masculine items are more socially desirable.

Future Research

More complex research designs in which moderator variables are incorporated are needed to research Holland's theory of career choice. Unless interactions between race, age, social class, sex and geographic locale are taken into account, generalizations may remain limited. Predictive accuracy might increase if two- or three-point codes were used (as opposed to only the high-point code) to classify people by Holland personality types. Research designs should also take into effect the indirect effects of life history measures to understand how they exert their influence and to obtain a better estimate of their total effect on vocational development.

Because the present study found that life history factors were particularly important in relation to female vocational preferences, more research should be directed toward these factors. In an examination of the factor stability of the BQ, Eberhardt and Muchinsky (1982a) found that half of the female factors had remained stable from 1968 to 1982. The reason for partial support of the female factors seems to involve the changes in roles and perceptions of women that have occurred in recent years. Perhaps these changing roles and perceptions have also led to changing experiences for women. Changes in life experiences may be attributable to the changing socialization in schools and family upbringing, and changing

aspirations of young women as early as high school. In light of the changing experiences of females, additional studies of the factor structure of the BQ are needed.

Future researchers may also want to include measurements of social desirability in their investigations. These measures could be used to help clarify the relationship between social desirability, masculinity, femininity and self-esteem.

Finally, future researchers should utilize a longitudinal design and a broader sample of females (e.g., inner-city vocational/technical school and junior college students) if at all possible. The longitudinal approach would help to determine whether environmental or situational variables play a major role in establishing the measures of the psychological constructs of sex-roles and self-esteem. This approach could also be used to assess whether sex-roles and self-esteem represent traits that are stable over time.

REFERENCES

Adams, C. H., & Sherer, M. (1982). Sex-role orientation and psychological adjustment: Comparison of MMPI profiles among college women and housewives. Journal of Personality Assessment, 42, 607-613.

Albright, L. E., & Glennon, J. R. (1961). Personal history correlates of physical scientists' career aspirations. Journal of Applied Psychology, 45, 281-284.

Allgeier, E. R. (1975). Beyond sowing and growing: The relationship of sex typing to socialization, family plans, and future orientation. Journal of Applied Social Psychology, 5, 217-226.

Aneshensel, C. S., & Rosen, B. C. (1980). Domestic roles and sex differences in occupational expectations. Journal of Marriage and the Family, 42, 121-131.

Antill, J. K., & Cunningham, J. D. (1980). The relationship of masculinity, femininity, and androgyny to self-esteem. Australian Journal of Psychology, 32, 195-207.

Astin, A. W., Green, K. C., Korn, W. S. & Schalit, M. (1986). The American freshman: Twenty year trends, 1966-1985. Los Angeles: University of California, Higher Education Research Institute, Graduate School of Education.

Astin, H. S. (1967). Career development during the high school years. Journal of Counseling Psychology, 14, 94-98.

Auster, C. J., & Auster, D. (1981). Factors influencing women's choice of nontraditional careers: The role of family, peers, and counselors. Vocational Guidance Quarterly, 29, 253-263.

Bachman, J. G. (1970). Youth in transition (Vol. 2). Ann Arbor, MI: Institute for Social Research.

Bachman, J. G., & O'Malley, P. M. (1977). Self-esteem in young men: A longitudinal analysis of the impact of educational and occupational attainment. Journal of Personality and Social Psychology, 35, 365-380.

Bailey, C. R., & Mednick, M. T. (1988). Career aspiration in black college women: An examination of performance and social self-esteem. Women and Therapy, 6, 65-75.

Baird, L. L. (1970). The relation of vocational interests to life goals, self-rating of ability and personality traits, and potential for achievement. Journal of Counseling Psychology, 17, 233.239.

Baruch, G. K. (1972). Maternal influences upon college women's attitudes toward women and work. Developmental Psychology, 6, 32-37.

Bassoff, E. S., & Glass, G. V. (1982). The relationship between sex roles and mental health: A meta-analysis of twenty-six studies. The Counseling Psychologist, 10, 105-112.

Beane, J. A., & Lipka, R. P. (1980). Self-concept and self-esteem: A construct differentiation. Child Study Journal, 10, 1-6.

Beck, A. T. (1967). Depression: Clinical, experimental and therapeutic aspects. New York: Harper & Row.

Bedeian, A. G.. Geagud, R. J., & Zmud, R. W. (1977). Test-retest reliability and internal consistency of the short form of Coopersmith's Self-Esteem Inventory. Psychological Reports, 41, 1041-1042.

Bem, S. L. (1975). Sex-role adaptability: One consequence of psychological androgny. Journal of Personality and Social Psychology, 31, 634-643.

Bem, S. L. (1979). Theory and measurement of androgyny: A reply to the Pedhazur-Tetenbaum and Locksley-Colten critiques. Journal of Personality and Social Psychology, 37, 1047-1054.

Bem, S. L. (1981). Bem Sex-Role Inventory professional manual. Palo Alto, CA: Consulting Psychologists Press.

Berdie, R. F. (1944). Factors related to vocational interests. Psychological Bulletin, 41, 137-155.

Betz, M., & O'Connell, L. (1989). Work orientations of males and females: Exploring the gender socialization approach. Sociological Inquiry, 59, 318-330.

Betz, N. E., & Hackett, G. (1981). The relationship of career-related self-efficacy expectations to perceived career options in college women and men. Journal of Counseling Psychology, 28, 399-410.

Blackman, S. (1986). The masculinity-femininity of women who study college mathematics. Sex Roles, 15, 33-41.

Blai, B. (1987). College and university freshmen shift values, attitudes and goals. College Student Journal, 21, 194-200.

Blau, F. D. (1978). The data on women workers, past, present, and future. In A. H. Stromberg & S. Harkess (Eds.), Women working (pp. 29-62). Palo Alto, CA: Mayfield.

Bledsoe, J. C. (1983). Factorial validity of the Bem Sex-Role Inventory. Perceptual and Motor Skills, 56, 55-58.

Block, J. H. (1973). Conceptions of sex role: Some cross-cultural and longitudinal perspectives. American Psychologist, 28, 512-526.

Brenner, O. C., & Tomkiewicz, J. (1979). Job orientation of males and females: Are sex differences declining? Personnel Psychology, 32, 741-750.

Briere, J., Ward, R., & Hartsough, W. R. (1983). Sex-typing and cross-sex-typing in "androgynous" subjects. Journal of Personality Assessment, 47, 300-302.

Brown, D. (1987). The status of Holland's theory of vocational choice. Career Development Quarterly, 36, 13-23.

Buri, J. R., Kirchner, P. A., & Walsh, J. M. (1987). Familial correlates of self-esteem in young american adults. Journal of Social Psychology, 127, 583-588.

Burke, K. L. (1986). Comparison of psychological androgyny within a sample of female college athletes who participate in sports traditionally appropriate and traditionally inappropriate for competition by females. Perceptual and Motor Skills, 63, 779-782.

Burlin, F. D. (1976). The relationship of parental education and maternal work and occupational aspiration in adolescent females. Journal of Vocational Behavior, 9, 99-104.

Burns, R. B. (1979). The self-concept in theory, measurement, development and behavior. New York: Longsman.

Bustamante, A., & Chang, A. F. (1975). Male-female attitudes toward female academic success and failure in masculine versus feminine occupational fields. Psychology, A Quarterly Journal of Human Behavior, 16, 39-43.

Campbell, D. P., & Hansen, J. C. (1981). Manual for the Strong-Campbell Interest Inventory (3rd ed.). Stanford, CA: Stanford University Press.

Campbell, D. P., & Holland, J. L. (1972). A merger in vocational interest research: Applying Holland's theory to Strong's data. Journal of Vocational Behavior, 2, 353-376.

Cascio, W. F. (1975). Accuracy of verifiable biographical information blank responses. Journal of Applied Psychology, 60, 767-769.

Chaney, F. B., & Owens, W. A. (1964). Life history antecedents of sales, research, and general engineering interest. Journal of Applied Psychology, 48, 101-105.

Chow, E. N. L. (1987). The influence of sex-role identity and occupational attainment on the psychological well-being of Asian American women. Psychology of Women Quarterly, 11, 69-82.

Clarey, J. H., & Sanford, A. (1982). Female career preference and androgyny. The Vocational Guidance Quarterly, 30, 258-264.

Cole, N. S., & Hanson, G. R. (1971). An analysis of the structure of vocational interests. Journal of Counseling Psychology, 18, 478-486.

Cole, S. (1986). Sex discrimination and admission to medical school, 1929-1984. American Journal of Sociology, 92, 549-567.

Collins, J., Reardon, M., & Waters, L. K. (1980). Occupational interest and perceived personal success: Effects of gender, sex-role orientation, and the sexual composition of the occupation. Psychological Reports, 47, 155-159.

Constantinople, A. (1973). Masculinity-femininity: An exception to a famous dictum? Psychological Bulletin, 80, 389-407.

Coopersmith, S. (1967). The antecedents of self-esteem. San Francisco: W. H. Freeman and Company.

Coopersmith, S. (1987). Self-Esteem Inventories. Palo Alto, CA: Consulting Psychologists Press.

Crandall, R. (1973). The measurement of self-esteem and related constructs. In J. P. Robinson & P. R. Shaver (Eds.), Measures of Social and Psychological Attitudes (pp. 68-87). Ann Arbor, MI: Institute for Social Research.

Crook, R. H., Healy, C. C., & O'Shea, D. W. (1984). The linkage of work achievement to self-esteem, career maturity, and college achievement. Journal of Vocational Behavior, 25, 70-79.

Darley, S. A. (1976). Big-time careers for the little woman: A dual-role dilemma. Journal of Social Issues, 32, 85-98.

Deutsch, C. J., & Gilbert, L. A. (1976). Sex role stereotypes: Effect on perceptions of self and others and on personal adjustment. Journal of Counseling Psychology, 23, 373-379.

DeWinne, R. F., Overton, T. D., & Schneider, L. J. (1978). Types produce types--especially fathers. Journal of Vocational Behavior, 12, 140-144.

Dorgan, M., Goebel, B. L., & House, A. E. (1983). Generalizing about sex role and self-esteem: Results or effects? Sex Roles, 9, 719-724.

Durkin, K., Zaveri, P., & Condor, S. (1986). Further evidence on the British version of AWS: Differences between androgynous and feminine women. British Journal of Social Psychology, 25, 335-336.

Eberhardt, B. J. (1979). Biodata determinants of vocational typology. Unpublished doctoral dissertation, Iowa State University, Ames.

Eberhardt, B. J., & Muchinsky, P. M. (1982a). An empirical investigation of the factor stability of Owens' Biographical Questionnaire. Journal of Applied Psychology, 67, 138-145.

Eberhardt, B. J., & Muchinsky, P. M. (1982b). Biodata determinants of vocational typology: An integration of two paradigms. Journal of Applied Psychology, 67, 714-727.

Eberhardt, B. J., & Muchinsky, P. M. (1984). Structural validation of Holland's hexagonal model: Vocational classification through the use of biodata. Journal of Applied Psychology, 69, 174-181.

Eccles, J. S. (1987). Gender roles and women's achievement-related decisions. Psychology of Women Quarterly, 11, 135-172.

Erdwins, C. J., Tyer, Z. E., & Mellinger, J. C. (1980). Personality traits of mature women in student versus homemaker roles. Journal of Psychology, 105, 189-195.

Etaugh, C., & Spandikow, D. B. (1981). Changing attitudes toward women: A longitudinal study of college students. Psychology of Women Quarterly, 5, 591-594.

Feldman, S., & Meir, E. I. (1976). Measuring women's interests using Holland's vocational classification. Journal of Vocational Behavior, 9, 345-353.

Fiorentine, R. (1988). Increasing similarity in the values and life plans of male and female college students? Evidence and implications. Sex Roles, 18, 143-158.

Fischer, J. L., & Narus, L. R., Jr. (1981). Sex-role development in late adolescence and adulthood. Sex Roles, 7, 97-106.

Fitzgerald, L. F., & Betz, N. E. (1983). Issues in the vocational psychology of women. In W. B. Walsh & S. B. Osipow (Eds.), Handbook of vocational psychology (pp. 111-114). Hillsdale, NJ: Erlbaum.

Folsom, C. H., Jr. (1971). The validity of Holland's theory of vocational choice. Unpublished doctoral dissertation, University of Maine, Orono.

Forrest, L., & Mikolaitis, N. (1986). The relational component of identity: An expansion of career development theory. Career Development Quarterly, 35, 76-88.

Frost, F., & Diamond, E. E. (1979). Ethnic and sex differences in occupational stereotyping by elementary school children. Journal of Vocational Behavior, 15, 43-54.

Gaffey, R. C., & Walsh, W. B. (1974). Concurrent validity and Holland's theory. Journal of Vocational Behavior, 5, 41-51.

Galejs, I., & King, A. (1983). Sex-role perceptions of traditional and nontraditional college women. Journal of Psychology, 113, 257-263.

Ginzberg, E., Ginsburg, S. W., Axelrad, S., & Herma, J. L. (1951). Occupational choice. New York: Columbia University Press.

Goldberg, R. E. (1975). Sex role stereotypes and career versus homemaking orientations of women. In S. H. Osipow (Ed.), Emerging woman: Career analysis and outlooks (pp. 91-115). Columbus, OH: Charles E. Merrill.

Gottfredson, L. S. (1982). The sex fairness of unnormed interest inventories. Vocational Guidance Quarterly, 31, 128-132.

Graef, M. I., Wells, D. L., Hyland, A. M., & Muchinsky, P. M. (1985). Life history antecedents of vocational indecision. Journal of Vocational Behavior, 27, 276-297.

Grandy, T. G., & Stahmann, R. F. (1974). Types produce types: An examination of personality development using Holland's theory. Journal of Vocational Behavior, 5, 231-239.

Green, L. B., & Parker, H. J. (1965). Parental influence upon adolescents' occupational choice: A test of an aspect of Roe's theory. Journal of Counseling Psychology, 12, 379-383.

Greenfeld, S., Greiner, L., & Wood, M. M. (1980). The "feminine mystique" in male-dominated jobs: A comparison of attitudes and background factors of women in male-dominated versus female-dominated jobs. Journal of Vocational Behavior, 17, 291-309.

Gregg, C. H., & Dobson, K. (1980). Occupational sex role stereotyping and occupational interests in children. Elementary School Guidance & Counseling, 15, 66-75.

Growe, G. A. (1980). Parental behavior and self-esteem in children. Psychological Reports, 47, 499-502.

Hannah, J. A. S., & Kahn, S. E. (1989). The relationship of socioeconomic status and gender to the occupational choices of grade 12 students. Journal of Vocational Behavior, 34, 161-178.

Hansen, J. I. C. (1988). Changing interests of women: Myth or reality? Applied Psychology: An International Review, 37, 133-150.

Hansen, J. I. C., & Campbell, D. P. (1985). Manual for the Strong Interest Inventory (4th ed.). Stanford, CA: Stanford University Press.

Hansen, J. I. C., & Johansson, C. B. (1972). The application of Holland's vocational model to the Strong Vocational Interest Blank for women. Journal of Vocational Behavior, 2, 479-493.

Hanson, G. R., Lamb, R. R., & English, E. (1974). An analysis of Holland's onterest types for women: A comparison of the Strong-Holland and the ACT vocational interest profile scales for women. Journal of Vocational Behavior, 4, 259-269.

Hansson, R.O., Chernovetz, M. E., & Jones, W. H. (1977). Maternal employment and androgyny. Psychology of Women Quarterly, 2, 76-78.

Harmon, L.W. (1981). The life and career plans of young adult college women: A follow-up study. Journal of Counseling Psychology, 28, 416-427.

Haworth, G., Povey, R., & Clift, S. (1986). The attitudes towards Women Scale (AWS-B): A comparison of women in engineering and traditional occupations with male engineers. British Journal of Social Psychology, 25, 329-334.

Heesacker, M., Elliot, T. R., & Howe, L. A. (1988). Does the Holland code predict job satisfaction and productivity in clothing factory workers? Journal of Counseling Psychology, 35, 144-148.

Heilbrun, A. B., Jr. (1981). Gender differences in the functional linkage between androgyny, social cognition, and competence. Journal of Personality and Social Psychology, 41, 1106-1118.

Heilbrun, A. B., Jr., & Fromme, D. K. (1965). Parental identification of late adolescents and level of adjustment: The importance of parental-model attributes, ordinal position, and sex of the child. Journal of Genetic Psychology, 107, 49-59.

Helmreich, R. L., Spence, J. T., & Gibson, R. H. (1982). Sex-role attitudes: 1972-1980. Personality and Social Psychology Bulletin, 8, 656-663.

Henry, P., & Bardo, H. R. (1987). Expressed occupational choice of nontraditional premedical students as measured by the Self-directed Search: An investigation of Holland's theory. Psychological Reports, 60, 575-581.

Herzog, A. R., & Bachman, J. G. (1982). Sex role attitudes among high school seniors. Ann Arbor, MI: Institute for Social Research.

Hinrichsen, J. J., Follansbee, D. J., & Ganellen, R. (1981). Sex-role-related differences in self-concept and mental health. Journal of Personality Assessment, 45, 584-592.

Hoffman, D. M., & Fidell, L. S. (1979). Characteristics of androgynous, undifferentiated, masculine, and feminine middle-class women. Sex Roles, 5, 765-781.

Hoffman, L. W. (1977). Changes in family roles, socialization, and sex differences. American Psychologist, 32, 644-657.

Hoffman, M. L. (1977). Personality and social development. Annual Review of Psychology, 28, 295-321.

Holland, J. L. (1958). A personality inventory employing occupational titles. Journal of Applied Psychology, 42, 336-342.

Holland, J. L. (1959). A theory of vocational choice. Journal of Counseling Psychology, 6, 35-44.

Holland, J. L. (1962). Some explorations of a theory of vocational choice: I. One- and two-year longitudinal studies. Psychological Monographs, 76 (Whole No. 545).

Holland, J. L. (1965). Manual for the Vocational Preference Inventory. Palo Alto, CA: Consulting Psychologists Press.

Holland, J. L. (1966). The psychology of vocational choice. Waltham, MA: Blaisdell.

Holland, J. L. (1968). Explorations of a theory of vocational choice: VI. A longitudinal study using a sample of typical college students. Journal of Applied Psychology Monograph Supplement, 52, Part 2, 1-37.

Holland, J. L. (1973). Making vocational choices: A theory of careers. Englewood Cliffs, NJ: Prentice-Hall.

Holland, J. L. (1976). Vocational preferences. In M. D. Dunnette (Ed.), Handbook of industrial and organizational psychology (pp. 521-570). Chicago: Rand-McNally.

Holland, J. L. (1985). Making vocational choices (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Holland, J. L. (1987). Current status of Holland's theory of careers: Another perspective. Career Development Quarterly, 36, 24-30.

Holland, J. L., & Lutz, S. W. (1968). Predicting a student's vocational choice. Personnel and Guidance Journal, 46, 428-436.

Holland, J. L., & Nafziger, D. H. (1972). A note about the validity of the Self-Directed search. Unpublished manuscript, Center for Social Organization of Schools, Johns Hopkins University.

Houser, B. B., Garvey, C. (1983). The impact of family, peers, and educational personnel upon career decision making. Journal of Vocational Behavior, 23, 35-44.

Housley, K., Martin, S., McCoy, H., Greenhouse, P., Stigger, F., & Chopin, L. (1987). Self-esteem of adolescent females as related to race, economic status, and area of residence. Perceptual and Motor Skills, 64, 559-566.

Ireson, C. (1978). Girls' socialization for work. In A. H. Stromberg & S. Harkess (Eds.), Women working (pp. 176-200). Palo Alto, CA: Mayfield.

Jagacinski, C. M. (1987). Engineering careers: Women in a male-dominated field. Psychology of Women Quarterly, 11, 97-110.

Jenkins, S. R. (1989). Longitudinal prediction of women's careers: Psychological, behavioral, and social-structural influences. Journal of Vocational Behavior, 34, 204-235.

Johnson, B. W., Redfield, D. L., Miller, R. L., & Simpson, R. E. (1983). The Coopersmith Self-esteem Inventory: A construct validation study. Educational and Psychological Measurement, 43, 907-913.

Johnson, M. M. (1963). Sex role learning in the nuclear family. Child Development, 34, 319-333.

Johnson, R. W. (1976). Test review [Strong-Campbell Interest Inventory]. Measurement and Evaluation in Guidance, 9, 40-45.

Jones, S. C. (1973). Self- and interpersonal evaluations: Esteem theories versus consistency theories. Psychological Bulletin, 79, 185-199.

Kearney, H. R. (1979). Feminist challenges to the social structure and sex roles. Psychology of Women Quarterly, 4, 16-31.

Keith, P. M. (1988). The relationship of self-esteem, maternal employment, and work-family plans to sex-role orientations of late adolescents. Adolescence, 23, 959-966.

Kelly, J. A., & Worell, L. (1976). Parent behaviors related to masculine, feminine, and androgynous sex role orientations. Journal of Consulting and Clinical Psychology, 44, 843-851.

Kelly, J. A., & Worell, J. (1977). New formulations of sex roles and androgyny: A critical review. Journal of Consulting and Clinical Psychology, 45, 1101-1115.

Kenkel, W. F., & Gage, B. A. (1983). The restricted and gender-typed occupational aspirations of young women: Can they be modified? Family Relations, 32, 129-138.

Keys, D. E. (1985). Gender, sex role, and career decision making of certified management accountants. Sex Roles, 13, 33-46.

Klecka, W. R. (1980). Discriminant analysis. Beverly Hills, CA: Sage Publications.

Klimoski, R. J. (1973). A biographical data analysis of career patterns in engineering. Journal of Vocational Behavior, 3, 103-113.

Korman, A. K. (1966). Self-esteem variable in vocational choice. Journal of Applied Psychology, 50, 479-486.

Korman, A. K. (1967). Self-esteem as a moderator of the relationship between self-perceived abilities and vocational choice. Journal of Applied Psychology, 51, 65-67.

Korman, A. K. (1971). Industrial and organizational psychology. Englewood Cliffs, NJ: Prentice-Hall.

Kulberg, G. E., & Owens, W. A. (1960). Some life history antecedents of engineering interests. Journal of Educational Psychology, 51, 26-31.

Lamke, L. K. (1982a). Adjustment and sex-role orientation in adolescence. Journal of Youth and Adolescence, 11, 247-259.

Lamke, L. K. (1982b). The impact of sex-role orientation on self-esteem in early adolescence. Child Development, 53, 1530-1535.

Lapan, R. T., Boggs, K. R., & Morrill, W. H. (1989). Self-efficacy as a mediator of investigative and realistic general occupational themes on the Strong-Campbell Interest Inventory. Journal of Counseling Psychology, 36, 176-182.

Layton, W. L. (1958). Counseling use of the Strong Vocational Interest Blank. Minneapolis: University of Minnesota Press.

Lemkau, J. P. (1979). Personality and background characteristics of women in male-dominated occupations: A review. Psychology of Women Quarterly, 4, 221-240.

Lemkau, J. P. (1984). Men in female-dominated professions: Distinguishing personality and background features. Journal of Vocational Behavior, 24, 110-122.

Lewin, M., & Tragos, L. M. (1987). Has the feminist movement influenced adolescent sex role attitudes? A reassessment after a quarter century. Sex Roles, 16, 125-135.

Lips, H. M., & Colwill, N. L. (1988). Psychology addresses women and work: Canadian research in 1980s. Canadian Psychology, 29, 57-68.

Lorr, M., & Stefic, E. (1978). An orientation and motivation inventory. Psychological Reports, 42, 911-914.

Lundy, A., & Rosenberg, J. A. (1987). Androgyny, masculinity, and self-esteem. Social Behavior and Personality, 15, 91-95.

Lyson, T. A. (1981). The changing sex composition of college curricula: A shift-share approach. American Educational Research Journal, 18, 503-511.

Lyson, T. A. (1986). Race and sex differences in sex role attitudes of southern college students. Psychology of Women Quarterly, 10, 421-428.

Lyson, T. A., & Brown, S. S. (1982). Sex-role attitudes, curriculum choice, and career ambition: A comparison between women in typical and atypical college majors. Journal of Vocational Behavior, 20, 366-375.

MacDonald, N. E., Ebert, P. D., & Mason, S. E. (1987). Marital status and age as related to masculine and feminine personality dimensions and self-esteem. Journal of Social Psychology, 127, 289-298.

Marsh, H. W., Antill, J. K., & Cunningham, J. D. (1987). Masculinity, femininity, and androgyny: Relations to self-esteem and social desirability. Journal of Personality, 55, 661-685.

McBroom, W. H. (1987). Longitudinal change in sex role orientations: Differences between men and women. Sex Roles, 16, 439-452.

Mead, M. (1949). Male and female, a study of the sexes in a changing world. New York: Morrow.

Medvene, A. M. (1969). Occupational choice of graduate students in psychology as a function of early parent-child interactions. Journal of Counseling Psychology, 16, 385-389.

Miller, M. J., Heck, R. M., & Prior, D. (1988). Comparing general occupational themes of women of ofur academic majors using the Strong-Campbell Interest Inventory. Psychological Reports, 63, 508-510.

Miller, S. M. (1975). Effects of maternal employment on sex role perception, interests, and self-esteem in kindergarten girls. Developmental Psychology, 11, 405-406.

Monahan, C. J. (1983). A decision theoretic approach to the study of vocational behavior: Intrasubject predictions of vocational preference. Unpublished doctoral dissertation, Iowa State University, Ames.

Moore, H. A., & Ollenburger, J. C. (1987). What sex is your parachute? Work and Occupations, 13, 511-531.

Moore, S. M., & Rosenthal, D. A. (1980). Sex-roles: Gender, generation, and self-esteem. Australian Psychologist, 15, 467-477.

Mosier, C. I. (1951). Problems and designs of cross-validation. Educational and Psychological Measurement, 11, 5-11.

Muchinsky, P. M. (1990). Psychology applied to work (3rd ed.). Pacific Grove, CA: Brooks/Cole.

Mumford, M. D., & Owens, W. A. (1982). Life history and vocational interests. Journal of Vocational Behavior, 21, 330-348.

Nachmann, B. (1960). Childhood experience and vocational choice in law, dentistry, and social work. Journal of Counseling Psychology, 7, 243-250.

Navran, L., & Kendall, L. M. (1971). A canonical correlational analysis of the SVIB, the Holland VPI, and the EPPS. Journal of Counseling Psychology, 18, 514-519.

Neimeyer, G. J., Brown, M. T., Metzler, A. E., Hagans, C., & Tanguy, M. (1989). The impact of sex, sex-role orientation, and construct type on vocational differentiation, integration, and conflict. Journal of Vocational Behavior, 34, 236-251.

Neimeyer, G. J., Metzler, A. E., & Bowman, R. (1988). Effects of sex, career orientation, and occupational type on vocational integration, differentiation, and conflict. Journal of Counseling Psychology, 35, 139-143.

Neiner, A. G., & Owens, W. A. (1985). Using biodata to predict job choice among college graduates. Journal of Applied Psychology, 70, 127-136.

Nevill, D. D., & Schlecker, D. I. (1988). The relation of self-efficacy and assertiveness to willingness to engage in traditional/nontraditional career activities. Psychology of Women Quarterly, 12, 91-98.

O'Dowd, D. D., & Beardslee, D. C. (1960). College student images of a selected group of professions and occupations. USOE, Cooperative Research No. 562 (8142). Middletown, CT: Wesleyan University.

O'Dowd, D. D., & Beardslee, D. C. (1967). Development and consistency of student images of occupations. Cooperative Research Project No. 5-0858. Rochester, MI: Oakland University.

Oppenheimer, V. K. (1973). Demographic influence on female employment and the status of women. In J. Huber (Ed.), Changing women in a changing society (pp. 184-199). Chicago: University of Chicago Press.

Osipow, S. H. (1973). Theories of career development (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Osipow, S. H. (1975). Introduction: Concepts in considering women's careers. In S. H. Osipow (Ed.), Emerging woman (pp. 1-9). Columbus, OH: Charles E. Merrill.

Owens, W. A. (1968). Toward one discipline of scientific psychology. American Psychologist, 23, 782-785.

Owens, W. A. (1971). A quasi-actuarial basis for individual assessment. American Psychologist, 26, 992-999.

Owens, W. A. (1976). Background data. In M. D. Dunnette (Ed.), Handbook of industrial and organizational psychology (pp. 609-644). Chicago: Rand-McNally.

Owens, W. A., & Schoenfeldt, L. F. (1979). Toward a classification of persons. Journal of Applied Psychology, 65, 569-607.

Parsons, J. E., Ruble, D. N., Hodges, K. L., & Small, A. W. (1976). Cognitive-developmental factors in emerging sex differences in achievement-related expectancies. Journal of Social Issues, 32, 47-61.

Paterson, D. G. (1962). Values and interests in vocational guidance. In Proceedings of the Fourteenth International Congress of Applied Psychology (pp. 118-125).

Pederson, J. S. (1988). Constraining influences on the vocational guidance of girls from 1910-1930. The Career Development Quarterly, 36, 325-336.

Pedhazur, E. J. (1982). Multiple regression in behavioral research (2nd Ed.). New York: Holt, Rinehart and Winston.

Pedhazur, E. J., & Tetenbaum, T. J. (1979). Bem Sex Role Inventory: A theoretical and methodological critique. Journal of Personality and Social Psychology, 37, 996-1016.

Peng, S. S., & Jaffe, J. (1979). Women who enter male-dominated fields of study in higher education. American Educational Research Journal, 16, 285-293.

Peterson, C., & Austin, J. T. (1985). Review of Coopersmith Self-Esteem Inventories. In J. V. Mitchell, Jr. (Ed.), The ninth mental measurements yearbook (Vol. 1, pp. 396-397). Lincoln, NE: University of Nebraska Press.

Plas, J. M., & Wallston, B. S. (1983). Women oriented toward male dominated careers: Is the reference group male or female? Journal of Counseling Psychology, 30, 46-54.

Prager, K. J. (1983). Identity status, sex-role orientation, and self-esteem in late adolescent females. Journal of Genetic Psychology, 143, 159-167.

Prediger, D. J. (1982). Dimensions underlying Holland's hexagonal: Missing link between interests and occupations? Journal of Vocational Behavior, 21, 259-287.

Prediger, D. J., & Hanson, G. R. (1976). Holland's theory of careers applied to women and men: Analysis of implicit assumptions. Journal of Vocational Behavior, 8, 167-184.

Puglisi, J. T., & Jackson, D. W. (1980). Sex role identity and self esteem in adulthood. International Journal of Aging and Human Development, 12, 129-138.

Pyke, S. W., & Graham, J. M. (1983). Gender schema theory and androgyny: A critique and elaboration. International Journal of Women's Studies, 6, 3-17.

Rea, J. S., & Strange, C. C. (1983). The experience of cross-gender majoring among male and female undergraduates. Journal of College Student Personnel, 24, 356-363.

Renzetti, C. M. (1987). New wave or second stage? Attitudes of college women toward feminism. Sex Roles, 16, 265-277.

Rey, P. D., & Sheppard, S. (1981). Relationship of psychological androgyny in female athletes to self-esteem. International Journal of Sports Psychology, 12, 165-175.

Robinson, B. E., & Green, M. G. (1981). Beyond androgyny: The emergence of sex-role transcendence as a theoretical construct. Developmental Review, 1, 247-265.

Robson, P. J. (1988). Self-esteem - a psychiatric view. British Journal of Psychiatry, 153, 6-15.

Roe, A. (1957). Early determinants of vocational choice. Journal of Counseling Psychology, 4, 212-217.

Rogers, C. R. (1951). Client-centered therapy. Boston: Houghton Mifflin.

Rosenberg, M. (1965). Society and the adolescent self-image. Princeton, NJ: Princeton University Press.

Rosenkrantz, P, Vogel, S., Bee, H., Broverman, I., & Broverman, D. M. (1968). Sex-role stereotypes and self-concepts in college students. Journal of Consulting and Clinical Psychology, 32, 287-295.

Rounds, J. B., Jr., Davison, M. L., & Dawis, R. (1979). The fit between Strong-Campell Interest Inventory general occupational themes and Holland's hexagonal model. Journal of Vocational Behavior, 15, 303-315.

Rowland, R. (1980). Directions in sex role research: Past, present and future. Australian Psychologist, 15, 419-426.

Ruble, T. L. (1983). Sex stereotypes: Issues of change in the 1970s. Sex Roles, 9, 397-402.

Ruble, T. L., Cohen, R., & Ruble, D. N. (1984). Sex stereotypes: Occupational barriers for women. American Behavioral Scientist, 27, 339-356.

Rytina, N. F., & Bianchi, S. M. (1984). Occupational reclassification and changes in distribution by gender. Monthly Labor Review, 107, 11-17.

Sanford, L. T., & Donovan, M. E. (1984). Women and self-esteem. Garden City, NY: Anchor Press/Doubleday.

Schiffler, R. J. (1975). Demographic and social factors in women's work lives. In S. H. Osipow (Ed.), Emerging Woman (pp. 10-22). Columbus, OH: Charles E. Merrill.

Schoenfeldt, L. F. (1974). Utilization of manpower: Development and evaluation of an assessment-classification model for matching individuals with jobs. Journal of Applied Psychology, 59, 583-595.

Sewell, T. E. (1985). Review of Coopersmith Self-Esteem Inventories. In J. V. Mitchell, Jr. (Ed.), The ninth mental measurements yearbook (Vol. 1, pp. 397-398). Lincoln, NE: University of Nebraska Press.

Shann, M. H. (1983). Career plans of men and women in gender-dominant professions. Journal of Vocational Behavior, 22, 343-356.

Sherman, J. A. (1976). Social values, femininity, and the development of female competence. Journal of Social Issues, 32, 181-195.

Siegfried, W. D., MacFarlane, I., Graham, D. B., Moore, N. A., & Young, P. L. (1981). A reexamination of sex differences in job preferences. Journal of Vocational Behavior, 18, 30-42.

Slevin, K. F., & Wingrove, C. R. (1983). Real vs. perceived differences in how three intra-family generations of women view their roles in society. Perceptual and Motor Skills, 56, 959-970.

Smart, J. C. (1989). Life history influences on Holland's vocational type development. Journal of Vocational Behavior, 34, 69-87.

Spence, J. T., & Helmreich, R. L. (1980). Masculine instrumentality and feminine expressiveness: Their relationships with sex role attitudes and behaviors. Psychology of Women Quarterly, 5, 147-163.

Spence, J. T., Helmreich, R., & Stapp, J. (1975). Ratings of self and peers on sex role attributes and their relation to self-esteem and conceptions of masculinity and femininity. Journal of Personality and Social Psychology, 32, 29-39.

Spokane, A. R. (1985). A review of research on person-environment congruence in Holland's theory of careers. Journal of Vocational Behavior, 26, 306-343.

Stafford, I. P. (1984). Relation of attitudes toward women's roles and occupational behavior to women's self-esteem. Journal of Counseling Psychology, 31, 332-338.

Standley, K., & Soule, B. (1974). Women in male-dominated professions: Contrasts in their personal and vocational histories. Journal of Vocational Behavior, 4, 245-258.

Steinmann, A., & Fox, D. J. (1966). Male-female perceptions of the female role in the United States. Journal of Psychology, 64, 265-276.

Steinmann, A., Levi, J., & Fox, D. J. (1964). Self-concept of college women compared with their concept of the ideal woman and men's ideal woman. Journal of Counseling Psychology, 11, 370-374.

Sternglanz, S. H., & Serbin, L. A. (1974). Sex role stereotyping in children's television programs. Developmental Psychology, 10, 710-715.

Stokes, J. P., & Peyton, J. S. (1986). Attitudinal differences between full-time homemakers and women who work outside the home. Sex Roles, 15, 299-310.

Strahan, R. F. (1975). Remarks on Bem's measurement of psychological androgyny: Alternative methods and a supplementary analysis. Journal of Consulting and Clinical Psychology, 43, 568-571.

Strange, C. C., & Rea, J. S. (1983). Career choice considerations and sex role self-concept of male and female undergraduates in nontraditional majors. Journal of Vocational Behavior, 23, 219-226.

Super, D. E. (1957). The psychology of careers. New York: Harper & Row.

Super, D. E. (1972). The future of vocational development theory. In J. M. Whiteley (Ed.), Perspectives in vocational development. Washington, DC: American Psychological Association.

Tallichet, S. E., & Willits, F. K. (1986). Gender-role attitude change of young women: Influential factors from a panel study. Social Psychology Quarterly, 49, 219-227.

Tharenou, P. (1979). Employee self-esteem: A review of the literature. Journal of Vocational Behavior, 15, 316-346.

Thompson, B. (1984). Canonical correlation analysis. Newbury Park, CA: Sage Publications.

Tinsley, H. E. A., Kass, R. A., Moreland, J. R., & Harren, V. A. (1983). A longitudinal study of female college students' occupational decision making. Vocational Guidance Quarterly, 32, 89-102.

Utz, P., & Korben, D. (1976). The construct validity of the occupational themes on the Strong-Campbell Interest Inventory. Journal of Vocational Behavior, 9, 31-42.

Waite, L. J., & Berryman, S. E. (1986). Job stability among young women: A comparison of traditional and nontraditional occupations. American Journal of Sociology, 92, 568-595.

Welch, B. A. (1983). Sex-role orientation, stress, and subsequent health status demonstrated by two scoring procedures for Bem's scale. Psychological Reports, 52, 69-70.

Wells, A. J. (1988). Variations in mothers' self-esteem in daily life. Journal of Personality and Social Psychology, 55, 661-668.

Wells, L. E., & Marwell, G. (1976). Self-esteem. Beverly Hills: Sage.

Werts, C. E. (1968). Paternal influence on career choice. Journal of Counseling Psychology, 15, 48-52.

Whitley, B. E., Jr. (1983). Sex role orientation and self-esteem: A critical meta-analytic review. Journal of Personality and Social Psychology, 44, 765-778.

Whitley, B. E., Jr. (1988). Masculinity, femininity, and self-esteem: A multitrait-multimethod analysis. Sex Roles, 18, 419-431.

Wigington, J. H. (1983). The applicability of Holland's typology to clients. Journal of Vocational Behavior, 23, 286-293.

Willemsen, E. W. (1987). Sex-role orientation, self-esteem, and uniqueness: An exploration of the undifferentiated category. Psychological Reports, 60, 859-866.

Williams, C. M. (1972). Occupational choice of male graduate students as related to values and personality: A test of Holland's theory. Journal of Vocational Behavior, 2, 39-46.

Wilson, J., Weikel, W. J., & Rose, H. (1982). A comparison of nontraditional and traditional career women. Vocational Guidance Quarterly, 31, 109-117.

Winters, C. J., & Sorensen, J. (1975). Individual factors related to career orientation in women. In S. H. Osipow (Ed.), Emerging Woman (pp. 51-67). Columbus, OH: Charles E. Merrill.

Wirtenberg, T. J., & Nakamura, C. Y. (1976). Education: Barrier or boon to changing occupational roles of women. Journal of Social Issues, 32, 165-179.

Wolfe, L. K., & Betz, N. E. (1981). Traditionality of choice and sex-role identification as moderators of the congruence of occupational choice in college women. Journal of Vocational Behvior, 18, 43-55.

Wylie, R. C. (1968). The present status of self theory. In E. F. Borgatta & W. W. Lambert (Eds.), Handbook of personality theory and research (pp. 728-787). Chicago: Rand-McNally.

Wylie, R. C. (1974). The self-concept (Vol. 1) (rev. ed.). Lincoln, NE: University of Nebraska Press.

Yanico, B. J. (1981). Sex-role self-concepts and attitudes related to occupational daydreams and future fantasies of college women. Journal of Vocational Behavior, 19, 290-301.

Zuckerman, D. M. (1980). Self-esteem, personal traits, and college women's life goals. Journal of Vocational Behavior, 17, 310-319.

Zuckerman, D. M. (1981). Family background, sex-role attitudes, and life goals of technical college and university students. Sex Roles, 7, 1109-1126.

APPENDIX A:

STRONG-CAMPBELL INTEREST INVENTORY

(From Hansen and Campbell, 1985)

Copies of the Strong-Campbell Interest Inventory may be obtained from Consulting Psychologists Press, Palo Alto, California.

APPENDIX B:

BIOGRAPHICAL QUESTIONNAIRE

(From Owens, 1971)

APPENDIX C:

BEM SEX-ROLE INVENTORY

(From Bem, 1981)

Copies of the Bem Sex-Role Inventory may be obtained from Consulting Psychologists Press, Palo Alto, California.

APPENDIX D:

SELF-ESTEEM INVENTORY

(From Coopersmith, 1987)

Copies of the Coopersmith Self-Esteem Inventory may be obtained from Consulting Psychologists Press, Palo Alto, California.

APPENDIX E:

MODIFIED INFORMED CONSENT FORM

THE ANTECEDENTS OF FEMALE VOCATIONAL PREFERENCE

The purpose of this investigation is to understand the basis of vocational preferences expressed by women. In particular, this study is intended to help discover whether a woman's adolescent life experiences, gender role clarity, and self-esteem are related to the vocational preferences she holds as an adult. Please read the instructions at the top of the following four questionnaires and complete them accordingly. Remember, however, that you are NOT required to give your name.

It should take you approximately two hours to complete these four surveys. This data collection technique is efficient and free of any risk or discomfort, and, therefore, it seems to be the most appropriate procedure for this investigation.

You are welcome to obtain your individual results on these questionnaires, as well as the results of the experiment in general. To obtain your personal results, retain this page, which has your personal identification number on it, and bring it to Laura Reichel, W263 Logomarcino at a later date. Because this information is often used for career guidance, you might find it helpful in choosing a career path.

Your responses to these questionnaires will be anonymous and confidential. Your name will not be associated with your test results. You are the only person who can associate the identification number on your test with a name. You are free to discontinue your participation in this experiment at any time without the loss of credit.

If you have any questions about this experiment, please feel free to ask the proctors.

THANK YOU FOR PARTICIPATING

ACKNOWLEDGMENTS

I would like to thank the many people who contributed to my graduate studies and to the writing of this dissertation. First, I would like to thank the members of my doctoral committee, Drs. Huba, Layton, Phye, and Strahan, whose constructive comments and suggestions were greatly appreciated. Special thanks goes out to Dr. Woodman, who stepped in at the last minute as a substitute committee member for my oral defense.

I would also like to extend special thanks to my major professor Dr. Paul Muchinsky. He was not only instrumental in the writing of this dissertation, but provided invaluable professional advice and guidance throughout my graduate career. In addition, Paul provided me with invaluable experiences (and financial support) in the professional realm by allowing me to help him on consulting projects. Not only have I learned to be a much better I/O psychologist than I thought possible due to the excellent role model he provides, but I also feel I have gained a colleague and friend. Paul has not only given me guidance, but has instilled confidence in my own abilities as well. Thus, I would like to extend both my thanks and my admiration to my major professor Dr. Paul M. Muchinsky.

Finally, I would like to extend my appreciation and love to my family. First, I would like to thank my parents who

have been very supportive (morally and financially) throughout my education. They are responsible for helping me to appreciate the value of education. I would also like to thank my husband, Brian, without whose support this project would have taken much longer. He helped to motivate me through the final pages of this dissertation and spent many hours at the typewriter helping to shape my project. Finally, I would like to thank my daughter Alicia who was well behaved both *in utero* and after birth. Her cooperation was key to preventing the present study from being extended indefinitely.

This research was aided by a Grant-in-Aid of Research from Sigma Xi, The Scientific Research Society.